



# Myopericarditis After the Pfizer Messenger Ribonucleic Acid Coronavirus Disease Vaccine in Adolescents

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Reports have emerged of myocarditis and pericarditis predominantly after the second dose of the coronavirus disease messenger ribonucleic acid vaccine. We describe 13 patients aged 12-17 years who presented with chest pain within 1 week after their second dose of the Pfizer vaccine and were found to have elevated serum troponin levels and evidence of myopericarditis. (*J Pediatr* 2021;238:317-20).

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On May 10, 2021, the US Food and Drug Administration extended the Emergency Use Authorization of the Pfizer-BioNTech messenger ribonucleic acid (mRNA) coronavirus disease (COVID-19) vaccine for adolescents aged 12-15 years.<sup>1</sup> Following this authorization, large numbers of adolescents across the country began to receive immunization. As of June 21, 2021, 98 008 adolescents aged 12-15 years and 69 489 adolescents aged 16 and 17 years in Washington state completed the 2-dose schedule of the mRNA COVID-19 vaccine.<sup>2</sup>

Reports of post-COVID-19 vaccine myocarditis and pericarditis have emerged, particularly after the second dose of the mRNA vaccine. Initial cases were noted predominantly in male adolescents and young adults in the Israeli military.<sup>3</sup> Subsequently, US institutions have reported 7 cases in adolescents aged >16 years<sup>4</sup> and 7 cases in young adults.<sup>5</sup> As the age range of eligibility for the COVID-19 vaccine has broadened in Washington, we have cared for a cohort of younger patients with postvaccination myopericarditis. Here we describe clinical and cardiac magnetic resonance imaging (CMR) findings for 13 patients aged 12-17 years seen at our center.

## Methods

With Institutional Review Board approval, we performed a retrospective electronic medical record review. Inclusion criteria were patients aged <18 years presenting with severe chest pain and signs of myopericarditis within 1 week of receiving the second dose of the Pfizer COVID-19 vaccine between April 1, 2021, and June 21, 2021.

## Results

Clinical and laboratory findings are presented in **Table I**. We identified 13 patients with myopericarditis, with a median

age of 15 years (range, 12-17 years). The majority of patients were male (n = 12; 92%), and non-Hispanic white (n = 10; 76.9%). The median time to presentation from the second dose of the Pfizer COVID-19 mRNA vaccine was 3 days (range, 2-4 days). According to the inclusion criteria, all patients had sudden onset of intense, persistent chest pain that was not exacerbated by movement or activity. The most common accompanying symptoms were shortness of breath (n = 6; 46.2%), tactile temperature (n = 5; 38.5%), and myalgias (n = 4; 30.7%).

All patients had an elevated serum troponin level (median, 9.18 ng/mL; range, 0.65-18.5 ng/mL). The median serum brain natriuretic peptide level was 37.5 pg/mL (range, 7-87 pg/mL). C-reactive protein was elevated in patients in whom it was measured (n = 10; median, 3.7 mg/dL; range, 1.4-6.5 mg/dL). COVID-19 nucleocapsid immunoglobulin G antibody was measured in 9 patients and was negative in all 9.

Cardiac testing results are presented in **Table II**. Nine patients had an abnormal electrocardiogram, with ST segment elevation the most common finding. All patients underwent echocardiography on admission; 11 patients had normal left ventricular (LV) systolic function, and 2 patients demonstrated mildly reduced LV systolic function as well as regional LV wall motion abnormalities. The median LV ejection fraction (LVEF) was 60% (range, 45%-69%; normal defined as >55%). No patients had significant pericardial effusion. One patient had an incidental finding of bicuspid aortic valve without regurgitation or stenosis.

All patients underwent CMR within 1 week of presentation. All CMRs performed were abnormal, showing late gadolinium enhancement in a patchy subepicardial to transmural pattern with predilection for the inferior LV free wall (**Figure**). In addition, all CMRs had evidence of edema in corresponding segments by T2-weighted CMR and met the Lake Louise criteria<sup>6</sup> for myocarditis. LV regional wall

CMR	Cardiac magnetic resonance imaging
COVID-19	Coronavirus disease
LV	Left ventricular
LVEF	Left ventricular ejection fraction
mRNA	Messenger ribonucleic acid

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The authors declare no conflicts of interest.

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