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Case Report

Pericarditis Following mRNA-Based COVID-19 Vaccination

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Abstract

Background: The sudden outbreak of 2019 novel Coronavirus in Wuhan, China, rapidly grew into a global pandemic. Vaccines are urgently needed to prevent its spread but also to restore social and economic activities via generating mass immunization.

Case report: We report the case of a male patient who developed pericarditis after administration of the second dose of the Pfizer-BioNTech mRNA Coronavirus disease 2019 (COVID-19) vaccine. Why should an emergency physician be aware of pericarditis after mRNA-based COVID-19 vaccination? Health providers should have a high suspicion of pericarditis after COVID-19 vaccination in order to provide prompt clinical management.

Keywords: COVID-19; Vaccine; pericarditis; WHO; X-ray

Introduction

On March 11, 2020, the World Health Organization (WHO) announced that Coronavirus disease 2019 (COVID-19) is a 'public-health emergency of international concern'. Since December 2019, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2) has infected over 195 million people worldwide [1].

In December 2020, the Food and Drug Administration (FDA) issued the emergency use authorization (EUA) for the Pfizer-BioNTech COVID-19 (BNT162b2) vaccine and the Moderna COVID-19 (mRNA-1273) vaccine, for the prevention of COVID-19 [2].

Myocarditis and pericarditis have been recognized as a rare complication of COVID-19 mRNA vaccinations, after reports of myocarditis and pericarditis in mRNA vaccine recipients especially in young adult and adolescent males. However, in June 2021, the benefit-risk assessment for COVID-19 vaccination shows a favorable balance for all age and sex groups, as it was determined by the Advisory Committee on Immunization Practices (ACIP), in June 2021 [3]. In this case report, we describe a patient with pericarditis after receiving an mRNA-based COVID-19 vaccine.

Case Presentation

A 35-year-old German man with no significant past medical history was admitted to the Emergency Department complaining of acute, constant, retrosternal chest pain that worsened during inspiration and while lying supine,3 days after receiving the second dose of the Pfizer-BioNTech vaccine. He had not tested positive for Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) in the past.

On presentation, the patient's temperature was 37.5°C, heart rate was 90 bpm, and blood pressure was 120/80 mmHg. Physical examination was remarkable for the presence of a pericardial friction rub heard over the left sternal border. His electrocardiogram was notable for an upward concave ST-segment elevation in the inferior (II, III, aVF) and lateral (V5, V6) leads and a ST-segment depression in aVR lead (Figure 1). Chest X-ray was unremarkable. Echocardiography revealed a small circumferential pericardial effusion with the largest diameter in diastole being approximately 5 mm at the lateral right ventricular wall.

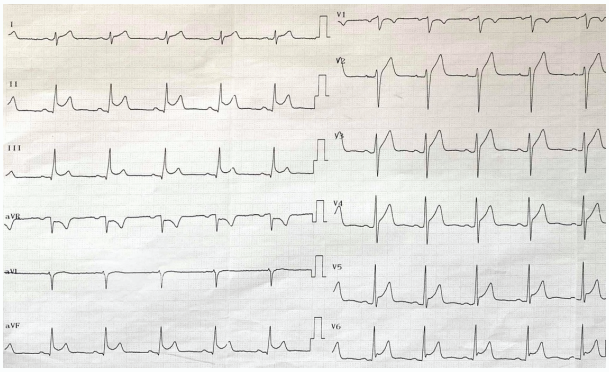

Figure 1: Electrocardiogram (ECG) finding in a patient with pericarditis.

Laboratory evaluation revealed greatly elevated C reactive protein levels (10.3 mg/dl with normal values <0.5) along with mild elevation of Erythrocyte Sedimentation Rate (ESR) (18 mm/h with normal values: 10 mm/h-15 mm/h). The rest of hematological tests, including high- sensitivity troponin serum levels, serologic are screening for

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connective tissue diseases, thyroid hormone levels, and serum tumor marker measurements were unremarkable. Viral serologies were negative for SARS-CoV-2, adenovirus, rhinovirus, parvovirus B19, Human Herpesvirus 6 (HHV-6), Human Immunodeficiency Virus (HIV), Hepatitis A, B and C viruses, Coxsackie viruses and Enteric Cytopathic Human Orphan (ECHO) viruses. All of the blood cultures were also sterile.

Considering all the above, the patient was diagnosed with acute pericarditis. His symptoms improved significantly with the initiation of colchicine (1 mg bid) and aspirin (1 grid). A regression of the pericardial effusion was also observed. The patient was hospitalized for 3 days and discharged in stable condition on a course of aspirin and colchicine. Unfortunately, he was lost to follow-up.

Discussion

In this case report, we report a patient with pericarditis after receiving the second shot of an mRNA-based COVID-19 vaccine. Pericarditis and myocarditis are rare adverse cardiovascular events after mRNA-based COVID-19 vaccinations which were not previously identified in the large safety and efficacy trials but they were reported to the Vaccine Adverse Event Reporting System (VAERS). Between December 2020 and May 2021, there were 552 (0.4%) reported cardiovascular events and 103 were labeled as myocarditis and 106 as pericarditis [4].

The causal relationship between vaccines and these adverse events remains unclear. The absences of other plausible causes suggest that the vaccine may be responsible for these rare events. Molecular mimicry between the SARS-CoV-spike glycoprotein and self-antigens, immune response to mRNA and activation of immunological pathways, and trigger of dysregulated cytokine expression have been proposed as the possible mechanisms for the development of myocarditis and pericarditis after COVID-19 vaccination [5].

A high index of suspicion of these potential complications after COVID-19 vaccination is required in order to make the appropriate diagnosis. However, it is important to highlight that these events are rare while SARS-CoV-2 infection is associated with more severe cardiovascular manifestations.

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