



Recurrent Myocarditis after the First Dose of SARS-CoV-2 mRNA-1273 Vaccine

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Abstract

Background: Several cases of myocarditis associated with COVID-19 mRNA vaccines have recently been reported in which the mechanism of vaccine-induced myocarditis has not been clearly identified.

Case Report: We describe the case of a 29-year-old man who had an episode of recurrent acute myocarditis (confirmed by cardiac magnetic resonance) six days after he received the first dose of SARS-CoV-2 mRNA-1273 vaccine. The causal nature of this recurrent myocarditis remains elusive, but the event appears to be very peculiar as it occurred after the first dose of SARS-CoV-2 vaccine in a subject with a history of previously healed myocarditis.

Conclusion: This case raises practical questions concerning the risk/benefit ratio of SARS-CoV-2 prophylactic vaccination in young people, especially in those with a history of myocardial or pericardial inflammatory disease.

Keywords: SARS-CoV-2 vaccine; Myocarditis; Cardiac magnetic resonance

Introduction

After the start of mass vaccination campaigns against COVID-19, an overall increased number of cases involving myopericarditis in patients who have received an mRNA vaccine against SARS-CoV-2 have been reported, mostly in young men who had received their second dose of vaccine [1,2].

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Case Presentation

A 29-year-old man presented to our emergency room with a two-day history of fever, precordial and interscapular pain; he had received the first dose of SARS-CoV-2 mRNA-1273 vaccine six days earlier.

Clinical examination revealed normal body temperature, blood pressure of 125/75 mmHg, heart rate of 81 beats per minute, and 99% oxygen saturation by breathing ambient air. The electrocardiogram showed sinus rhythm and ST-segment elevation in the inferior and lateral leads (Figure 1 Panel A). Blood tests demonstrated elevated C-Reactive Protein (CRP) (44.4 mg/L; nv: 0.0 mg/L to 5.0 mg/L), increased markers of myocardial damage, with highly sensitive Troponin T (hsTnT) of 15338 ng/L (nv: 0.0 ng/L to 53.5 ng/L), normal blood cell count, with no evidence of peripheral eosinophilia. The plasma Polymerase Chain Reaction (PCR) test for SARS-CoV-2 was negative, while no significant findings were present on the chest X-ray. On transthoracic echocardiography, normal biventricular function without abnormalities of regional wall motility was documented; there was neither significant valvular disease nor pericardial effusion. The patient was not transferred to cath lab immediately for the strong clinical suspect of recurrent myocarditis.

The patient infact reported a previous episode of non complicated acute myocarditis in May 2013 (confirmed by Cardiac Magnetic Resonance) (CMR) that had been treated with complete clinical resolution. In that hospitalization the coronarography was normal.

He was then fine until he received the first dose of the SARS-CoV-2 mRNA-1273 vaccine. Based on the clinical history and available data, anti-inflammatory treatment (acetylsalicylic acid 1.5 g/day) associated with colchicine (0.5 mg/day) was started. The patient's symptoms subsided over the next 24 h and the ECG showed partial resolution of the ST-segment changes, with the appearance of negative T waves in the precordial leads. CMR was performed 72 h after admission confirmed diagnosis of recurrent myocarditis highlighting the presence of myocardial edema of

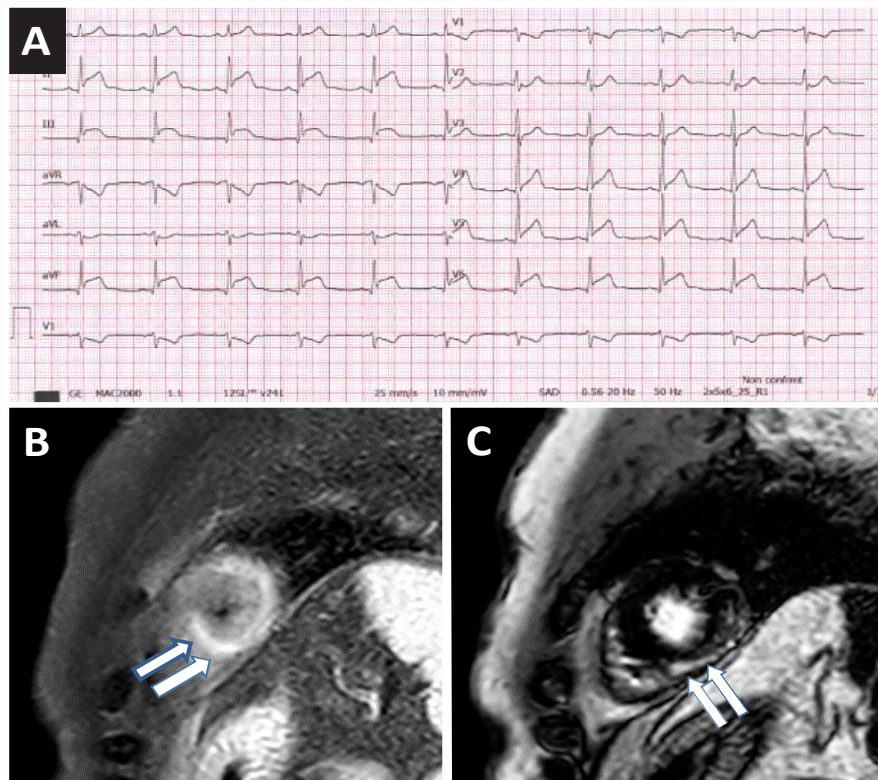


Figure 1: Panel A: ECG on admission. ST-segment elevation in the inferior and lateral leads. Panel B, C: Cardiac magnetic resonance. T2-weighted sequences with suppression of adipose tissue showing myocardial edema of the apex (arrows) which corresponds to subepicardial late-enhancement in the inversion recovery sequences of the inferior-apical wall (arrows).

the apex on T2-weighted sequences with suppression of adipose tissue (Figure 1 Panel B) and subepicardial late-enhancement (in the inversion recovery sequences) localized in the inferior apical wall (Figure 1 Panel C). Stroke volume and functional data analysis were normal. Investigations concerning viral serology and PCR screening for the main cardiotropic viruses, as well as for SARS-CoV-2 (on a new oropharyngeal sample) were negative. Due to the low-risk profile and favorable clinical course, the endomyocardial biopsy was not considered. Symptoms resolved completely within three days and the patient was discharged on day 9 on anti-inflammatory therapy with normalized hsTnT and CRP of 20.26 mg/L, and with a scheduled six-month follow-up with a new CMR evaluation.

Vaccine-related myocarditis has been reported since 2003 in healthy people after smallpox vaccination [3]. Several cases of myocarditis associated with COVID-19 mRNA vaccines have recently been observed. Most of these cases are described in young males patients, invariably presented with chest pain, usually 2 to 3 days after a second dose of mRNA vaccination, with evidence of elevated cardiac troponin levels myocarditis [1,2]. The mechanism of vaccine-induced myocarditis has not been clearly identified. It seems that the very high levels of antibodies that the second dose of this vaccine generates in young people can lead to an excessive immune reaction that could affect the heart [4].

In our young patient, the causal nature of recurrent acute myocarditis remains elusive, but the event appears to be very peculiar as it occurred after the first dose of SARS-CoV-2 mRNA-1273 vaccine in a subject with a history of previously healed myocarditis. Furthermore, the clinical course of our patient was mostly benign (with a spontaneous resolution and a preserved left ventricular

function) but limited information is available about the long-term sequela of recurrent myocarditis [5].

Almost all patients had resolution of symptoms and signs, and improvement in diagnostic markers and imaging with or without treatment. Despite rare cases of myocarditis, the benefit-risk assessment for COVID-19 vaccination shows a favorable balance for all age and sex groups; therefore vaccination remain currently recommended for everyone 12 years of age and older [1,2]. Studies are needed to elucidate the incidence, risk factors including genetic predisposition, prognosis, potential mechanisms, and reasons for sex differences, clinical course, treatment strategies, and long-term impact of myocarditis following COVID-19 vaccination.

Our case, however, adds practical questions concerning warning and above all on timing about SARS-CoV-2 prophylactic vaccination in young people with a history of myocardial or pericardial inflammatory disease.

Learning Points

1. COVID-19 vaccines are safe and effective reduce the risk of people spreading the virus that causes COVID-19 and preventing especially severe illness and death.
2. 2) Myocarditis and/or pericarditis were reported following vaccination with all COVID-19 vaccines especially in young health men who had received their second dose of vaccine.
3. Questions remain about warning and timing about SARS-CoV-2 prophylactic vaccination in young people with a history of myocardial or pericardial inflammatory disease.

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