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

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Research Article

Keywords: SARS-CoV-2 vaccine, myocarditis, cardiac magnetic resonance

Posted Date: July 16th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-699585/v1>

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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 presentation. 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-COV2 prophylactic vaccination in young people, especially in those with a history of myocardial or pericardial inflammatory disease.

Main Text

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 (Panel A). Blood tests demonstrated elevated C-reactive protein (CRP) (44.4 mg / L; nv, 0.0–5.0 mg / L), increased markers of myocardial damage, with highly sensitive troponin T (hsTnT) of 15338 ng / L (nv, 0.0-53.5 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 no significant valvular disease nor pericardial effusion. The patient reported a previous episode of acute myocarditis in 2013 (confirmed by cardiac magnetic resonance) (CMR) that had been treated with anti-inflammatory drugs with complete clinical resolution. 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, a recurrent episode of acute myocarditis was diagnosed and 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 hours 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 hours after admission and revealed myocardial edema of the apex on T2-weighted sequences with suppression of adipose tissue (Panel B) and subepicardial late-enhancement (in the inversion recovery sequences) localized in the inferior apical wall (Panel C). 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 (1). Several cases of myocarditis associated with COVID-19 mRNA vaccines have recently been observed in which the mechanism of vaccine-induced myocarditis has not been clearly identified. Most of these cases are described in young males after vaccination with the second dose of BNT162b2 (2, 3). 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 this young person, 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 sequelae of recurrent myocarditis (5).

In conclusion, this case raises practical questions concerning the risk/benefit ratio of SARS-COV2 prophylactic vaccination in young people, especially in those with a history of myocardial or pericardial inflammatory disease.

Declarations

Ethics approval and consent to participate:

not applicable

Consent for publication:

written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editors-in-Chief of this journal

Availability of data and materials:

yes

Competing interests:

no competing interests to declare

Funding:

none

Authors' contributions:

all Authors contributed equally in writing and revising the manuscript

Acknowledgements:

none

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Figures

Figure 1

Panel A: ECG on admission. ST-segment elevation in the inferior and lateral leads. Panel B and 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).