TRIDHA
Journal of Clinical Cases & Reports
Volume 2022, Issue S3, 6 pages
https://doi.org/10.46619/joccr.2022.5-S12.1001

CASE REPORT

Acute Myocarditis Following the Third Dose of SARS-Cov-2 Vaccine: A Case Report

Azam Mohammadi[1], Milad Rezaiye[2*], and Mohammad Ali Sheikh Beig Goharrizi[3]

[1]Director of Echo Lab, Nikan Hospital, Division of Cardiology, University of Shahid Beheshti Medical Sciences, Tehran, Iran
[2]Nursing Faculty, Baqiyatallah University of Medical Sciences, Tehran, IR Iran
[3]Atherosclerosis Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

Correspondence should be addressed to Milad Rezaiye, Nursing Faculty, Baqiyatallah University of Medical Sciences, Tehran, IR Iran

Received: 22 February 2022; Accepted: 05 March 2021; Published: 12 March 2022

ABSTRACT

BACKGROUND

COVID-19 pandemic has led to the development and use of the SARS-CoV-2 vaccine. In this study, we report a case with a history of multiple sclerosis that experienced acute Myocarditis following the third dose of the SARS-CoV-2 vaccine.

CASE PRESENTATION

A 20-years-old man with a history of multiple sclerosis was admitted to the hospital to visit due to recent retrosternal chest pain four days after the third dose of SARS-COV-2 vaccine (AstraZeneca vaccine). Initial electrocardiogram showed ST-Segment elevation in the inferior limb and precordial leads. However, Echocardiography was normal without any wall motion abnormality. Cardiac Magnetic Resonance (CMR) confirmed acute myocarditis. After treatment and monitoring, Echocardiography, cardiac troponin, CBC, ESR, and CRP were normal, without any symptoms two weeks later.

CONCLUSION

Consequently, vaccine-associated myocardial damage should be considered in the differential diagnosis in patients who have recently been vaccinated against COVID-19. Individuals with chest pain should be monitored regardless of their age and encouraged to perform relevant tests and at least an electrocardiogram.

KEYWORDS

COVID-19; Acute myocarditis; SARS-CoV-2 vaccine; AstraZeneca vaccine

ABBREVIATIONS

CMR: Cardiac Magnetic Resonance; WHO: World Health Organization; LV: Left Ventricular; RV: Right Ventricular; NSAIDs: Nonsteroidal Anti-inflammatory Drugs

BACKGROUND

According to the World Health Organization (WHO), as of November 21, 2021, more than 219 million people have been infected by Coronavirus-19 (COVID-19), and more than 4.5 million of these people have died from the disease. Approximately 3.2 billion people worldwide have been fully vaccinated against the COVID-19 [1]. Cardiac disorders such as Myocarditis, as a rare side effect, can be reported after vaccination, which could be a severe and significant complication [2]. Numerous responses to this complication have been proposed, such as secondary nonspecific systemic inflammatory response to vaccination or molecular mimicry between cardiac structures and SARS-CoV-2 viral proteins [3], or possibly due to greater systemic and immunological reactivity of mRNA vaccines compared to others [4].

CASE PRESENTATION

A 20-years-old man with a history of multiple sclerosis (clinically isolated syndrome-CIS) with a BMI of 22.4 kg/m^2 was admitted to the hospital to visit due to recent retrosternal chest pain (2 episodes of 30 minutes in the morning and evening), 4 days after the third dose of SARS-COV-2 vaccine (AstraZeneca vaccine). Moreover, he had received the first and second dose of the SARS-COV-2 vaccine (Sinopharm vaccine) 5 months and 4 months before.

The patient's medical history was as follows:

He did not have a history of recent traveling, allergy, or reaction to the vaccine. At the time of admission, he had chest pain and was physically examined, and his vital sign was normal. Initial electrocardiogram showed ST-Segment elevation in the inferior limb and precordial leads (Figure 1).

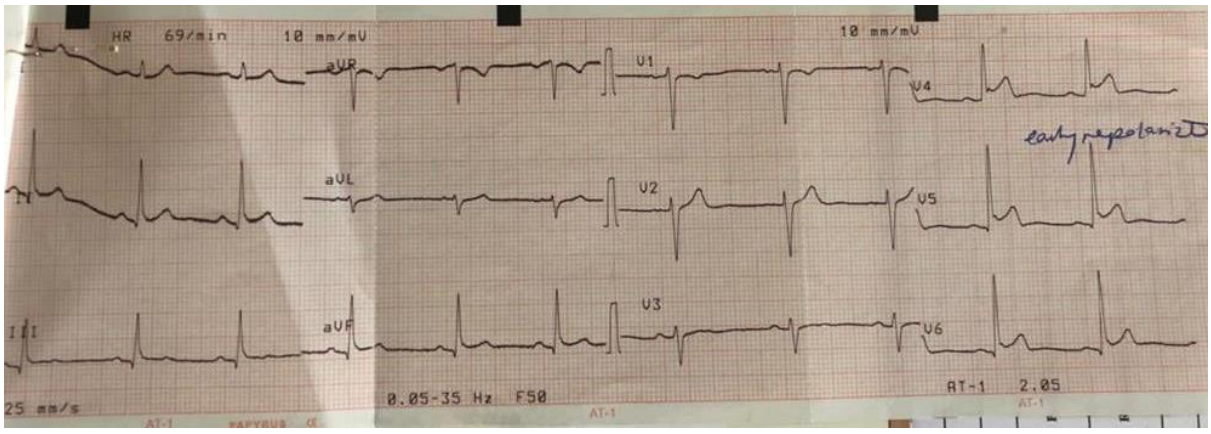


Figure 1: Initial electrocardiogram of the patient.

Echocardiography was normal without any wall motion abnormality.
Laboratory blood tests confirmed evidence of myocardial injury and systemic inflammation (Table 1).

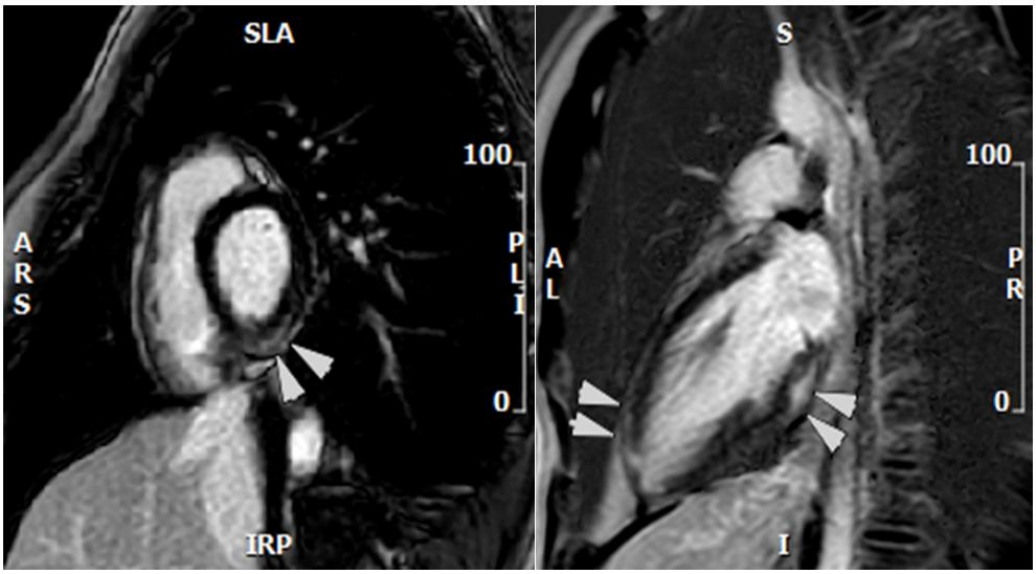
Covid-19 nasal and throat swab test was negative. Cardiac magnetic resonance showed normal LV (Left Ventricular) and RV (Right Ventricular) function. There was Myocardial hyperemia and localized myocardial

inflammation (edema) in the basal inferior and anterior apical segments with a non-trans mural subepicardial mid-wall GD enhancement of basal inferior apical, anterior segments of LV compatible with acute Myocarditis.

	Laboratory test	Patient's value		
Rows		5 days after vaccination	7 days after vaccination	14 days after vaccination
1	Troponin I	3.34	1.28	0.01
2	ESR	38	12	12
3	CRP	10.2	6.6	3

Table 1: Laboratory tests reports.

Figures 2 and 3 indicate subepicardial/mid-wall enhancement in the basal inferior and anterior apical segments of LV (Figure 2 and Figure 3).



Figures 2 and Figure 3: LGE images: Subepicardial/mid-wall enhancement in the basal inferior and anterior apical segments of LV.

According to Figure 4, the increase in signal intensity in the inferior basal segment indicates myocardial inflammation (Figure 4).

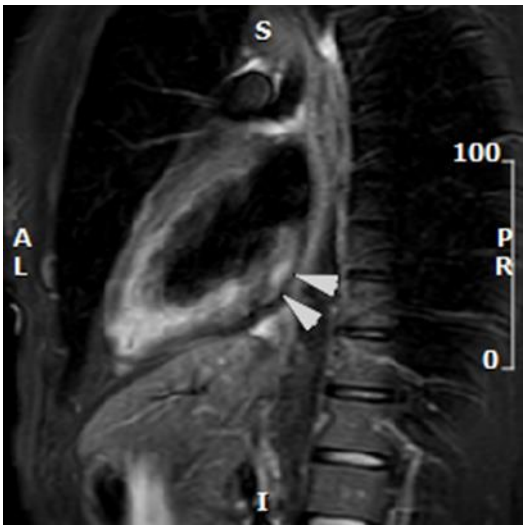


Figure 4: STIR T2WI (increased signal intensity in the inferior basal segment; myocardial inflammation).

The patient was started on supportive therapy for his symptoms, Beta-blockers for palpitation, and Colchicine and Nonsteroidal anti-inflammatory drugs (NSAIDs) began.

He was discharged home after 3 days of monitoring without any evidence of electrical or hemodynamic instability. Two weeks later, Echocardiography, cardiac troponin, CBC, ESR, and CRP were normal, without any symptoms.

DISCUSSION

Studies on the effects of vaccination on the heart (disorders), especially after vaccination with various coronavirus vaccines, are limited. However, studies have shown that some vaccines, including mRNA vaccines, cause Myocarditis [5,6]. Furthermore, most of these studies report that this complication occurs in younger men a few days after the second vaccination dose [7,8].

This complication has been reported rarely, and the possibility of a severe reaction after COVID-19 vaccination has not been reported [9]. However, in our reported case, the patient was referred to the hospital and hospitalized for a few days. At the time of admission, the electrocardiogram showed ST-segment elevation in the inferior limb and precordial leads. However, there was no sign of chest pain after hospitalization, but troponin was mildly increased and his vital signs were normal. However, a similar study reported clinical manifestations, including chest pain, electrocardiogram findings, and abnormal troponin levels and lymphadenopathy following vaccine-associated Myocarditis [10].

In addition, in another study of 4 patients with acute Myocarditis occurring within days of COVID-19 mRNA vaccination, the diagnosis of acute Myocarditis was so simple that the symptom was (the onset of) acute severe chest pain, and myocardial damage was detected by increasing troponin levels in all patients. CMR imaging abnormalities have been observed in several techniques and cannot be attributed to image artifacts. In addition, matching findings were reported to be typical for acute Myocarditis [11]. While in our patient vital signs and Echocardiography were normal without any wall motion abnormality.

In general, it cannot be stated with certainty that youth vaccination leads to Myocarditis because its prevalence has been reported to be very low. However, according to the results of similar studies in this field, post-vaccination monitoring and drug care for mRNA-related vaccine-induced myocardial injury should be encouraged during ongoing vaccination [8].

CONCLUSION

Consequently, vaccine-associated myocardial damage should be considered in the differential diagnosis in patients recently vaccinated against COVID-19 presented with chest pain. Therefore, individuals should be monitored regardless of their age and encouraged to perform relevant tests such as Troponin in the case of chest pain and at least an electrocardiogram.

DECLARATIONS

Funding

The study is not funded.

Competing Interests

The authors declare no competing interests.

Ethics Approval

This study was approved by the ethics committee of Shahid Beheshti University of Medical Sciences.

Consent to Participate

Written informed consent was obtained for participation in the study from participant.

Consent for Publication

Written informed consent was obtained for publication of data from participant.

Availability of Data and Material

All our study-related information is stored in secure folders with limited access. Electronic data files are stored on a file system with access restricted to designated researchers and data managers. The dataset is available from the corresponding author at Shahid Beheshti University of Medical Sciences.

Code Availability

Not applicable.

Authors' Contributions

MR searched the literature, collected the data, performed the statistical analyses, and wrote the manuscript; MSh and AM contributed to conception, design, data interpretation, and supervision of the study. All authors read and approved the final manuscript.

REFERENCES

1. Coronavirus (COVID-19) (2021).
2. Witberg G, Barda N, Hoss S et al. (2021) Myocarditis after COVID-19 vaccination in a large health care organization. The New England Journal of Medicine 385: 2132-2139.
3. Cereda A, Conca C, Barbieri L et al. (2021) Acute Myocarditis after the second dose of SARS-CoV-2 vaccine: Serendipity or atypical causal relationship? Anatolian Journal of Cardiology 25(7): 522-523.
4. Khogali F, Abdelrahman R (2021) Unusual presentation of acute perimyocarditis following SARS-COV-2 mRNA-1237 moderna vaccination. Cureus 13(7): e16590.
5. Bozkurt B, Kamat I, Hotez PJ (2021) Myocarditis with COVID-19 mRNA vaccines. Circulation 144(6): 471-484.
6. Mevorach D, Anis E, Cedar N et al. (2021) Myocarditis after BNT162b2 mRNA vaccine against COVID-19 in Israel. The New England Journal of Medicine 385:2140-2149.
7. Montgomery J, Ryan M, Engler R et al. (2021) Myocarditis following immunization with mRNA COVID-19 vaccines in members of the US military. JAMA Cardiology 6(10): 1202-1206.
8. Gargano JW, Wallace M, Hadler SC et al. (2021) Use of mRNA COVID-19 vaccine after reports of Myocarditis among vaccine recipients: Update from the advisory committee on immunization practices - United States, June 2021. Morbidity and Mortality Weekly Report 70(27): 977-982.

9. Jain SS, Steele JM, Fonseca B, et al. (2021) COVID-19 Vaccination-associated myocarditis in adolescents. Pediatrics 148(5): e2021053427.
10. Starekova J, Bluemke D, Bradham W et al. (2021) Myocarditis associated with mRNA COVID-19 vaccination. Radiology 301(2): 211430.
11. Kim HW, Jenista ER, Wendell DC et al. (2021) Patients with acute myocarditis following mRNA COVID-19 vaccination. JAMA Cardiology 6(10): 1196-1201.