

Treatment of Vaccine Induced Myocarditis and Pericarditis Symptoms in Covid-19 Negative Patients: Case Report

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Abstract

Myocarditis and Pericarditis have long been considered as possible effects of Covid-19, with retrospective studies demonstrating an increased likelihood of developing new onset cardiac inflammation in the months following a Covid-19 infection. Interestingly, a similar occurrence has been observed with mRNA Covid-19 vaccines, which raises the question whether Covid-19 vaccines increase an existing risk of myocarditis within infected patients or is this development independent of Covid-19 infection. In this report, to explore the possibility, two cases of Covid-19 negative patients shall be discussed who developed symptoms of myocarditis/pericarditis after receiving their vaccine dose.

Keywords: Covid-19; Myocarditis; Covid-19 vaccines.

Introduction

Covid-19 has had monumental effects ever since the initial outbreak of 2019. Its prevalence has grown to the size of global pandemic in a few short months since its inception and for the past 2 years, humankind has had to adapt its knowledge about this rapidly evolving disease while battling it at the same time. Vaccines represent one of our greatest lines of defense against future spread

of Covid-19 infections, and various vaccines have been developed to counter the SARS Cov-2 virus through all existing evolutionary variants.

Cardiac inflammation of the middle layer (myocarditis) or outer layer (pericarditis) is a recognized complication in patients who have had Covid-19. Presentation of acute myocarditis and pericarditis varies, however the common symptoms of shortness of

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breath, chest pain and palpitations have been widely observed. A retrospective study by Benjamin Buckley et al, covering more than 700,000 Covid-19 positive patients observed 5% of their sample size developing new onset myocarditis and up to 1.5% developing pericarditis within a year of their Covid-19 infection [1].

Similarly, a 2020 review of the link between Covid-19 and myocarditis revealed that 58% of the affected were males under the age of 60, with little to no pre-existing co-morbid conditions, and up to 91% of the affected had significantly elevated cardiac troponin levels [2].

However, the advents of Covid-19 vaccines have not been without side effects of their own. As with any pharmacological intervention, cases have come to light indicating a possible connection between Covid-19 vaccination and myocarditis/pericarditis. Balraj Singh and colleagues in 2021 explored the case of a 24-year-old male with no previous conditions, who developed chest pain after receiving the second dose of Pfizer-BioNTech vaccine and was diagnosed with myocarditis [3]. Similarly, a 2021 paper by Salah and Mehta further observed myocardial inflammation in 60% of patients that received the Pfizer-BioNTech vaccine, 33% with Moderna vaccine and 7% with Johnson and Johnson vaccine, with most cases arising 6-10 days after receiving the second dose of their respective vaccines [4].

Case report

In this paper, we discuss two cases of patients with no prior Covid-19 infection or any other significant risk factor who developed

symptoms of cardiac inflammation after receiving the Pfizer-BioNTech and Moderna vaccines respectively.

Case 1

A 45-year-old male with no prior co-morbid conditions received his first dose of the Pfizer-BioNTech vaccine on July 11th, 2021, with no reported complications of the first dose. He therefore received the second dose of the vaccine on his scheduled date of August 1st, 2021. Following the second dose however, he developed symptoms of chest pain, shortness of breath at rest as well as during physical exertion, palpitations and body aches leading to fatigue. Examination revealed no skin involvement, tenderness, or any new onset murmurs on auscultation. Vital signs revealed tachycardia only.

Initial assessment on the EKG revealed sinus tachycardia at 102 bpm. No abnormalities of the ST segments and T waves were noted and only a suspicion of left atrial enlargement was observed. The patient was kept under observation with a Holter monitor. Which revealed a range of tachycardic heart rates between 125-140bpm. Bloodwork revealed only moderately elevated cardiac troponin levels and antibodies for Covid-19 were negative. Treatment to relieve Myocarditis and Pericarditis symptoms was started.

The patient was started on a beta blocker (Metoprolol Succinate 25mg) as well as Dexamethasone 4mg daily for a total duration of 1 month, followed by a follow up visit where the patient expressed relief from his cardiac symptoms. His follow up EKG and blood tests also came out normalized.

Case 2

A 30-year-old white female with no pre-existing conditions was administered the Moderna vaccine first dose on January 8th, 2021, with no reported side effects to the first dose. The second dose was administered on July 28th, 2021, well after the recommended 14-21-day gap period between doses.

Similar to case 1, the patient also developed symptoms of chest pain, fatigue and palpitations one day after the second dose. Initial assessment revealed no hypertension, O₂ saturation within limit and a pulse of 125bpm was recorded. Assessment revealed tachycardia, which was confirmed with the EKG. No other EKG abnormalities were indicative of cardiac ischemia.

Like case 1, the patient was commenced on the same treatment protocol. Patient was treated with a beta blocker (Atenolol 25mg) for the heart rate and a steroid (Dexamethasone 4mg) for the inflammation. Much like case 1, she reported resolution of condition on follow up visits that were confirmed with EKG and blood tests normalized.

Discussion

Myocarditis and Pericarditis are manifestations of progressive inflammation of the cardiac layers. Etiologies include idiopathic (50%), infectious and non-infectious. Viral myocarditis and pericarditis dominate the infectious etiological category with Cocksachie B being the most common viral cause. Symptoms of both conditions overlap and the majority of the affected

present with a combination of chest pain, dyspnea on exertion and body aches.

In recent times owing to the Covid-19 pandemic, post-covid myocarditis and pericarditis have been recognized as complications of the disease. With the advent of vaccines, a number of studies also reported an increased likelihood of myocarditis and pericarditis in people receiving the Covid-19 vaccines. Of note, a large-scale study of over 2.5 million people registered in the Clalit Health Services database in Israel was conducted in which the registered people were crosschecked against those who had received at least one dose of the Pfizer-BioNTech vaccine and those who developed myocarditis or pericarditis following vaccine administration using a Kaplan-Meier analysis 42 days after the first dose. It was found that the highest incidence of myocarditis stood at 10.69 per 100,000 for males and an average of 2.13 per 100,000. The male subjects with the highest incidence were in the 16-29 year-old range of ages [5].

It is, therefore, established that myocarditis and pericarditis are very real complications of both the Covid-19 infection as well as the Covid-19 vaccine. However, as illustrated in our report, the cases did not previously have any history of Covid-19. They also did not have any pre-existing risk factors that would predispose them to myocarditis or pericarditis. As the only variable in those cases was the administration of the Covid-vaccines, it indicates a possible Covid-19 independent-risk of myocarditis and pericarditis following mRNA vaccine administration.

However, as data on this particular hypothesis is currently very limited, the CDC continues to recommend use of the Pfizer-BioNTech and Moderna mRNA vaccines for ages 5 years and older as they continue to be one of the best options of prevention of future Covid-19 infections. S. A. Meo compares the pharmacological efficacies of both mRNA vaccines and observed a 95% efficacy for the Pfizer-BioNTech and 94.5% for the Moderna vaccines respectively [6].

The CDC also recommends that any cases of myocarditis or pericarditis following mRNA vaccine administration be reported to VAERS, as well as urges clinicians to consider vaccine induced myocarditis/pericarditis in young adolescent male patients presenting with indicative symptoms following vaccine administration. Initial assessment with EKG, cardiac troponins and inflammatory markers

like C-Reactive Protein are encouraged as well as consultation with cardiologists for better diagnostic accuracy [7].

Conclusion

Vaccine induced myocarditis and pericarditis is a growing concern among prior Covid-positive as well as Covid-negative patients, and while evidence grows to support the link, the benefits of mRNA vaccines such as Pfizer-BioNTech and Moderna still outweigh the risks according to the CDC and still represent an important step in preventing future Covid-19 infections. More research and studies are required to explore this link particularly in Covid-negative patients in order to determine the vaccine specific pathology leading to myocarditis/pericarditis and hence, development of improved vaccines with decreased risk for these complications.

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