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Post-covid vaccine myopericarditis: Case series

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Abstract

In this case series, we illustrate two cases of patients who presented to the hospital with cardiac symptoms within one week of receiving the covid-19 vaccine.

It's worth mentioning that in our practice, we were exposed to more than eight cases over six months in the period between late 2021 and early 2022, but these were the cases suitable for publication.

Initially, post-covid vaccine myocarditis was not very well known or recognised and concluding such a diagnosis was not easy and needed loads of investigations and prolonged hospital stay to explain the underlying cause of the patient's presentation. However, with repeated exposure to such a presentation and increasing published evidence of such unusual reactions, diagnosis has become more accessible. A shorter hospital stay was needed to conclude a proper management plan.

Key words

Covid-19; m-RNA Vaccine; Palpitations; CT TAP Scan; Myopericarditi; Multidisciplinary decision making.

Case 1 Presentation

A fifty-nine-year-old female presented with palpitations. She denied chest pain, shortness of breath or any other associated symptoms. She had a background of breast fibroadenoma and hypercholesterolemia, being an ex-smoker but with excellent exercise tolerance.

Initial assessment revealed tachycardia of 121 beats per minute, raised blood pressure of 169/85 mmHg with an average temperature of 36.4^{o}C and unremarkable physical examination.

Blood test results showed raised white cell count of 22.3 10*9/L, and elevated Troponin T of 268 ng/L with normal renal functions.

ECG showed normal sinus rhythm with no ST segment or T wave changes. Chest X-ray showed no signs of focal consolidation, collapse or acute pleural abnormality with normal heart and mediastinal contours.

The presentation was unclear, and it was initially deemed to be an Acute Coronary Syndrome (ACS)-triggered arrhythmia, and the patient was started on ACS treatment.

On further investigations, D-dimer was negative but repeat Troponin showed up trending levels to 395 ng/L. That was associated with raised Creatine Kinase (CK) of 2395. Transthoracic Echocardiography (TTE) study was within normal limits, with no signs of Left ventricular impairment, Regional Wall Motion Abnormality (RWMA) or pericardial effusion. To exclude coronary artery disease (CAD), the patient underwent a coronary angiogram locally, which showed no evidence of significant obstruction (Figures 1,2).

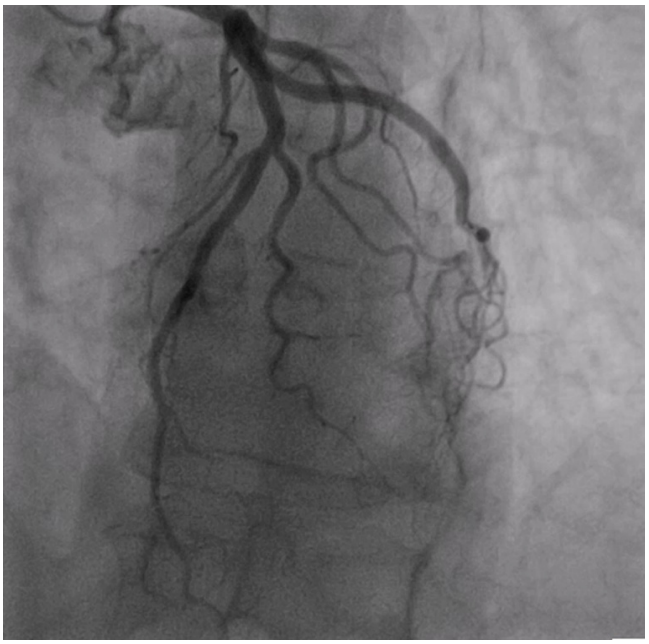

Figure 1: Coronary angiogram of the left system showing no evidence of coronary artery disease.

Figure 2: Coronary angiogram of the right system showing no evidence of coronary artery disease.

During her hospital admission, the patient was noticed to have intermittent episodes of low-grade fever, which persisted despite completing a course of antibiotics, but she remained otherwise clinically stable.

Further investigations were ordered to clarify the underlying causes of intermittent temperature spikes and persistently raised Troponin, CK and inflammatory markers not responding to antibiotics. The blood film showed mainly neutrophilia and did not show any sinister cells. That was reviewed by the Haematology team, who advised that this picture is highly suggestive of a reaction to underlying infection or inflammation. Thyroid Function Tests (TFTs) were within normal limits, procalcitonin levels returned negative, suggesting a low probability of bacterial infection, and Computerised Tomography of the Thorax, Abdomen and Pelvis (CT TAP) didn't locate any infectious foci. Microbiology opinion was sought, and the consensus was that the antibiotics could be stopped in light of negative PCT.

History was re-visited to investigate the cause of such unexplained presentation, and the patient reported receiving the m-RNA Covid-19 vaccine one week before the onset of symptoms. Consequently, Myopericarditis was suspected, and the patient was started on Colchicine and NSAIDS accordingly. A few days later patient's condition improved with no further temperature spikes. This was also reflected in declining inflammatory markers. Finally, the patient was safely discharged after a 15-day hospital stay. On the follow-up appointment, she was symptom-free with no further palpitations.

Case 2 Presentation

Twenty-two years old male presented to A&E with an ongoing history of intermittent chest pain and shortness of breath for four days that started one day after receiving a booster dose of the m-RNA Covid-19 vaccine. The patient had no pre-existing diseases or cardiovascular history. No cardiac risk factors were noted except for a family history of Myocardial Infarction (MI).

Initial assessment revealed tachycardia with a heart rate of 107 beats per minute and high blood pressure of 170/112 mmHg, while other vital signs were within normal limits. Physical examination was unremarkable. However, his Electrocardiogram (ECG) showed a widespread PR depression (Figure 3). This was associated with up-trending Troponin T rise on blood tests 587, 635 ng/L. Bedside transthoracic Echocardiography (TTE) revealed average Left Ventricular size and function with no signs of Right ventricular strain, pericardial effusion, or Regional Wall Motion Abnormality (RWMA).

The case was discussed with the cardiology team, and given the presentation and history, MI was deemed unlikely, and he was started on Myopericarditis treatment with Colchicine and Ibuprofen.

The patient's clinical condition improved on treatment with no further chest pain episodes. This was associated with significantly declining Troponin to 28.

The patient was discharged safely with an outpatient appointment to repeat TTE in three months which showed no new changes.

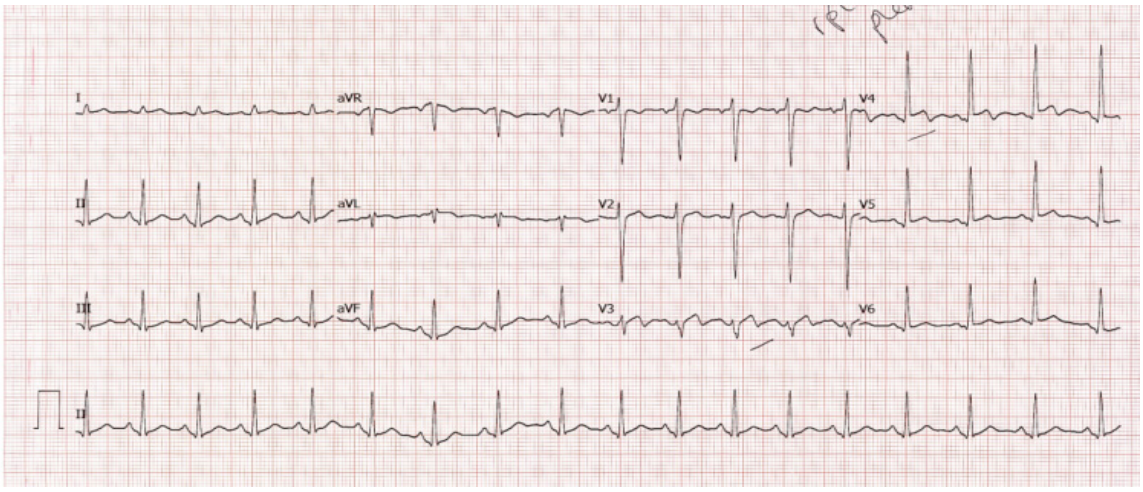

Figure 3: ECG showing widespread PR depression.

Discussion

Global studies have highlighted a positive correlation between covid-19 mRNA vaccination and the onset of myocarditis [6].

Data from more than 100 million individuals highlighted rates of myocarditis cases post-vaccination to be markedly greater in patients aged 35 years or younger. Men were found to be at the greatest risk aged 18-25 after their second dose. The association was more evident within one-week post covid vaccination [1,6].

Research on the long-term effects of covid vaccine-associated myocarditis is still awaited.

An American-Israel case series studied that the incidence of post-covid-19 vaccine MRNA myocarditis seems to be insignificant at around 0.3-0.5 cases per 100,000 vaccinated people [1].

– The post-second dose covid-19 vaccine myocarditis incidence appeared to be more notable by the data as younger individuals (age <30), especially males, were most affected [3].

– Post covid 19 vaccine myocarditis in patients appears to have a marked recovery in patients as opposed to myocarditis unrelated to covid 19/covid 19 vaccines, with >9/10 individuals functionally completely recovering usually and a low mortality rate with 99/100 individuals surviving [1,4,5].

Pathophysiology

-Gender, age, immunological and genetic factors can all contribute to the pathophysiological process of covid19 vaccine-induced myocarditis [2].

Postulated mechanisms include:

1. Immunological reaction to Covid Vaccine mRNA
2. SARS-Cov-2 spike glycoproteins antibodies inappropriately attacking myocardial proteins.
3. Hormonal variation, with higher testosterone levels possibly enhancing the pathophysiological process and oestrogen suppressing the specific immunological response [2].

Conclusion

Myopericarditis can be challenging to diagnose even with the highest capabilities in the largest tertiary cardiac centres, and clinical suspicion remains the cornerstone. Here, we are presenting our experience with post-covid vaccine myocarditis and sharing it with our colleagues around. This supports the literature evidence in the diagnosis and management of such unusual reactions and stresses the importance of high levels of suspicion in picking it up early, even in a District General Hospital (DGH) without the support of Cardiac MRI, which remains the gold standard diagnostic tool of Myocarditis.

Financial and competing interests' Disclosure: No conflict of interests declared.

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