



## CASE REPORT

# Acute Myopericarditis in a Pediatric Patient after First Dose of Pfizer BioNTech COVID - 19 Vaccination: First Case Report in the Kingdom of Bahrain

Ghada Al Qassim<sup>1</sup>, Vimalarani Arulsevam<sup>2</sup>, Suad R Al Amer<sup>3</sup>, Salah Al Ghanem<sup>4</sup>,  
Neale Nicola Kalis<sup>5</sup>

<sup>1</sup>MD, DCH, SSC-P, SF-PEM, Senior Consultant Pediatric Emergency Medicine, Emergency Medicine Department, Bahrain Defence Hospital, Royal Medical Services, Kingdom of Bahrain.

<sup>2</sup>MBBS, DNB (Ped.). FNB (Ped Card.), Specialist Pediatric Cardiology, Mohammed bin Khalifa Cardiac Center, Kingdom of Bahrain.

<sup>3</sup>MD, DCH, SSC-P, SF-Ped (Card), Consultant Pediatric Cardiology, Mohammed bin Khalifa Cardiac Center, Kingdom of Bahrain.

<sup>4</sup>MD, SBEM, MSc HCM(RCSI), Consultant Emergency Medicine, Emergency Medicine Department, Bahrain Defence Hospital, Royal Medical Services, Kingdom of Bahrain.

<sup>5</sup>MBChB, M Meds (Peds.), FCP (Peds. ) SA, Consultant Pediatric Cardiology, Mohammed bin Khalifa Cardiac Center, Kingdom of Bahrain.

**Affiliation:** Bahrain Defense Forces Hospital - Kingdom of Bahrain , Mohammed bin Khalifa bin Salman Al -Khalifa Cardiac Center and Royal College of Surgeons in Ireland – Medical University of Bahrain.

### \*Corresponding author:

Ghada Al Qassim, MD, DCH, SSC-P, SF-PEM, Senior Consultant Pediatric Emergency Medicine , Emergency Medicine Department, Bahrain Defence Hospital, Royal Medical Services, Kingdom of Bahrain  
E-mail: [gma\\_53@hotmail.com](mailto:gma_53@hotmail.com)

**Received date:** August 9, 2021; **Accepted date:** December 08, 2021; **Published date:** December 31, 2021

### Abstract

Coronavirus disease 2019 (COVID - 19 ) vaccination for children over 12 years of age began on May 2021 in the kingdom of Bahrain. Very limited data is available regarding the adverse events related to COVID -19 vaccination in children. This is a case report of a 12 year old previously healthy boy with acute myopericarditis who presented on day 5 after first dose of Pfizer COVID - 19 vaccination. Other causes of acute myopericarditis were ruled out. He was treated with non - steroidal anti-inflammatory drugs and recovered fully . This case of vaccine induced myocarditis was reported to the national task force of Bahrain for combating COVID - 19.

**Keywords:** Pfizer-BioNTech, COVID-19 vaccine, mRNA vaccine, Myocarditis, Pericarditis, Troponin I

### Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a novel coronavirus identified as the cause of coronavirus disease 2019

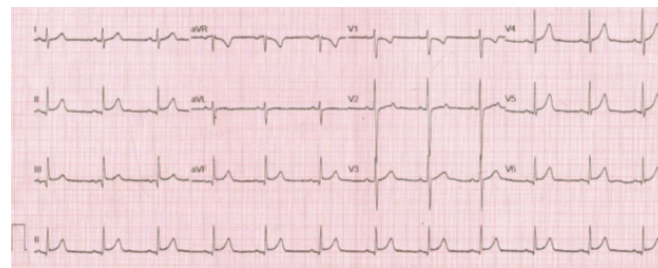
(COVID -19) that was reported in Wuhan, China in late 2019 and spread worldwide.<sup>1</sup> COVID -19 vaccines was intended to provide acquired immunity against COVID - 19 were produced.

Pfizer BioNTech was the first such COVID - 19 vaccine to be authorized by the United States food and drug administration (FDA) for emergency use for individuals more than 16 years of age.<sup>2</sup> It is composed of nucleoside-modified mRNA encoding a mutated form of the full-length spike protein of SARS-CoV-2, which is encapsulated in lipid nanoparticles. On May 10, 2021, the FDA revised the guideline and included children more than 12 years of age and older.<sup>2</sup> This vaccine demonstrated 94 - 95% efficacy in preventing COVID - 19 infection in 16 – 55 year old participants, and 100% efficacy among the 12–15 year old age group.<sup>2,3</sup> Systemic reactogenicity occurred more commonly in younger patients and after the second dose of the vaccine.<sup>2</sup> Recent case reports of acute myopericarditis have been published.<sup>4</sup> This is the first case of Pfizer vaccine induced acute myopericarditis in Bahrain.

### Case report

A 12-year-old previously healthy boy presented to the emergency department with history of left sided chest pain of two days duration. The chest pain was intermittent and pricking in nature. The patient had a few episodes of severe chest pain that woke him up from sleep, which lasted for a few minutes and subsided spontaneously. No history of breathlessness, palpitations, or loss of consciousness were reported. He had received the first dose of Pfizer COVID vaccine 5 days previously and after 24 hours of vaccination he developed fever which subsided with paracetamol. There was no history of recent viral illness and no known COVID - 19 exposure.

He was comfortable, afebrile, and hemodynamically stable on admission. There was no evidence of tachycardia (heart rate = 96 bpm). His blood pressure was 94/56mmHg and oxygen saturation was 98% in room air. Cardiac examination revealed a quiet precordium with normal heart sounds. His chest Roentgenogram was normal. His Electrocardiogram (ECG) showed normal sinus rhythm with heart rate of 80 beats per minute with ST segment elevation in inferior (II, III, aVF) and anterolateral (V4, V5, V6) leads and reciprocal ST depression in aVR and V1, (Figure 1)



**Figure 1:** ECG showing Saddle back ST elevation in inferior (II, III, aVF) and anterolateral (V4, V5, V6) leads and reciprocal ST depression in aVR and V1

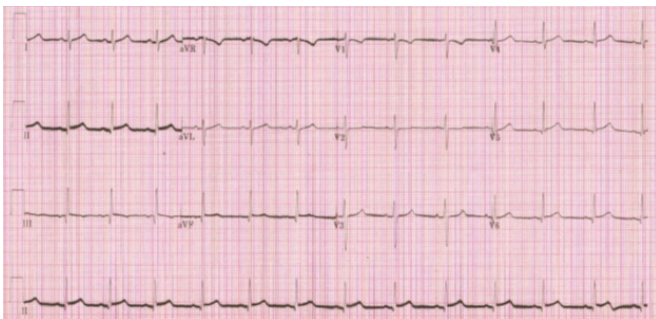
Echocardiogram showed normal heart structure and function with minimal pericardial effusion. Cardiac enzymes (troponin- I, creatinine kinase (CK) and creatinine kinase – MB) were highly elevated. Other inflammatory markers such as C-reactive protein (CRP) and lactate dehydrogenase were mildly elevated. His Pro – B natriuretic peptide, ferritin and D-dimer levels were normal. Complete blood count showed mild leucopenia . (Table 1)

**Table 1. Laboratory Parameters:**

S. No	Parameters	Value	Normal range
1	White blood cell count	3.78 x 10 <sup>9</sup> / L	4 - 11 x 10 <sup>9</sup> / L
2	Tropon in - I	6.7 μ g/ L	< 0.3 μ g/ L
3	Creatinine kinase	3.3 1 IU / L	20 - 200 IU / L
4	Creatinine kinase – MB	4 1. 9 IU/ L	< 25 IU / L
5	C - Reactive protein	1 3 mg / L	< 5 m g/ L
6	lactate dehydrogenase	257 IU / L	135 - 225 IU / L
7	Pro – B natriuretic peptide	175. 7 pg/ m L	< 300 p g/ m L
8	Ferritin	73.6 n g/ m L	30 - 400 n g/ m L
9	D - dimer	0.34 μg/ m L	0 - 0.5 μ g/ m L

Nasopharyngeal SARS COVID reverse transcriptase polymerase chain reaction (RT- PCR) test & respiratory panel for other viral infections were negative. SARS COV-2 antibody was non-reactive. Neutralizing antibody was 0.08 (cut off index (COI) > 1 is reactive) and spike protein antibody was 0.4 U/mL (COI > 0.8 is reactive). His clinical, ECG and laboratory parameters ruled out post COVID

multisystem inflammatory syndrome in children (MIS-C) and viral myocarditis. Hence, vaccine induced acute myopericarditis was considered and the patient was started on anti-inflammatory medication, Ibuprofen – 400 mg 8th hourly. ECG and cardiac enzymes were repeated after 24 hours. ECG showed resolution of ST segment elevation (Figure 2), decrease in troponin - I level (2.1 µg/L) and normal CK (189 IU/L) and CK-MB (22.3 IU/L) levels. He was hemodynamically stable throughout the hospital stay and was discharged after 48 hours. He was reported to the National task force of Bahrain for combating COVID - 19.



**Figure 2:** ECG showing resolution of ST elevation in inferior (II, III, aVF) and anterolateral (V4, V5, V6) leads.

## Discussion

Myocarditis is an inflammatory disorder of the myocardium characterized by injury of myocytes with associated inflammatory infiltrate.<sup>5</sup> Often pericarditis and myocarditis are observed in tandem, hence the term myopericarditis.<sup>6</sup> Post immunization myocarditis is a rare adverse event following vaccination. Immune mediated injury of the myocardium is believed to be the predominant pathogenic mechanism. There are case reports following smallpox and tetanus vaccination.<sup>7,8</sup>

On May 27, the U.S. Centers for Disease Control and Prevention (CDC) advisory group published report that there were increasing cases of myocarditis and pericarditis in adolescents and young adults after COVID-19 vaccination and recommended further study of the possibility of a link between myocarditis and mRNA vaccines, which include those from Pfizer and Moderna Inc.<sup>9</sup>

In Israel, 275 cases of myocarditis were reported between December 2020 and May 2021 among more than 5 million vaccinated people.<sup>10</sup> They state,

“there is a probable link between receiving the second dose of Pfizer vaccine and the appearance of myocarditis among men aged 16 to 30 “ and such a link was observed more among men aged 16 to 19 than in other age groups.

The Pediatrics Journal on June 7, 2021, reported seven adolescents of symptomatic acute myocarditis following the second dose of Pfizer BioNTech COVID - 19 Vaccination.<sup>4</sup> All 7 patients showed rapid symptom resolution. Three patients were treated with non-steroidal anti-inflammatory drugs alone and 4 received intravenous immune globulin and corticosteroids.

The health sciences authority of Singapore reported 4 cases of myocarditis involving young men aged 18 to 30 years. This is at the upper end of the expected range for this age group, based on background incidence rates.<sup>11</sup>

## Conclusion

Case reports published so far the occurrence of post COVID - 19 vaccine myocarditis within 4 days of the second dose of Pfizer vaccine, however this patient presented the same following the first dose of Pfizer COVID - 19 vaccine. Transient myocarditis associated with an mRNA vaccine needs further evaluation. Although the benefit of the vaccine outweighs the risk of rare adverse events; physicians and healthcare providers are urged to consider myopericarditis in adolescents and young adults who develop chest pain after COVID - 19 vaccination and to report to the public health committee.

## Declaration of Patient consent

The authors certify that they have obtained appropriate patient consent. The legal guardian has given his consent for images and other clinical information to be reported in the journal. The guardian understands that name and initials will not be published, and due efforts will be made to conceal patient identity.

## Financial support and Sponsorship

Nil

## Conflict of Interest

No Conflict of Interest

## References

1. WHO-convened global study of origins of SARS-CoV-2: China Part Joint WHO-China study: 14 January - 10 February 2021. <https://www.who.int/publications/i/item/who-convened-global-study-of-origins-of-sars-cov-2-china-part>. Published online on 30 March 2021. Accessed online 22 June 2021 from Google Scholar
2. Pfizer-BioNTech. Full Emergency Use Authorization (EUA) Prescribing Information, Revised 10 May 2021. Available at <http://abeling.pfizer.com/ShowLabeling.aspx?id=14471&format=pdf&#page=13> / Accessed online May 15 2021 from Google Scholar.
3. Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA Covid - 19 Vaccine. *N Engl J Med.* 2020; 383(27):2603-2615.
4. Marshall M, Ferguson I, Lewis P, Jaggi P et al, Symptomatic acute myocarditis in seven adolescents following Pfizer-BioNTech COVID - 19 Vaccination. *Pediatrics.* June 2021, e2021052478; DOI:<https://doi.org/10.1542/peds.2021-052478>
5. Feldman AM, McNamara D, Myocarditis. *N Engl J Med.* 2000;343(9):1388-1398. doi:10.1056/NEJM200011093431908. PMID: 11070105.
6. Woodruff JF, Viral myocarditis: a review. *AM J Pathol.* 1980;101:425-484
7. Halsell JS, Riddle JR, Atwood E, et al. Myopericarditis following smallpox vaccination among vaccinia-naïve US military personnel. *JAMA.* 2003; 289(24):3283-3289. doi:10.1001/jama.289.24.3283
8. Dilber E, Karagoz T, Ayetemir K, Ozar S et al, Acute myocarditis associated with tetanus vaccination. *Mayo clinic Proceedings.* 2003;78: 1431-1433
9. Pfizer-BioNTech COVID - 19 vaccine overview and safety (also known as COMIRNATY). Centers for disease control and prevention. Available at <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/different-vaccines/Pfizer-BioNTech>. Update on 28 september 2021. Accessed online on 05 October, 2021 from Google Scholar.
10. Israel sees probable link between Pfizer vaccine and myocarditis cases. Available at Reuters. <https://www.reuters.com/world/middle-east/israel-sees-probable-link-between-pfizer-vaccine-small-number-myocarditis-cases-2021-06-01/> Published June 2, 2021. Accessed online on 17 June 2021
11. Expert committee on covid-19 vaccination's assessment on myocarditis and pericarditis following mRNA covid-19 vaccination. Available at <https://www.moh.gov.sg/news-highlights/details/expert-committee-on-covid-19-vaccination's-assessment-on-myocarditis-and-pericarditis-following-mrna-covid-19-vaccination>, Published on June 11, 2021. Accessed online on 17 June 2021 from Google Scholar.