

## Case Report

# Congestive Heart Failure Following COVID-19 Vaccination

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### Abstract

Myocardial injury following vaccination, particularly coronavirus disease 2019 (COVID-19), smallpox, influenza, hepatitis B has been documented as a rare side effect. In this report, we present a case of congestive heart failure that developed in a healthy male following the BNT162b2 mRNA-Pfizer-BioNTech vaccine. A 47-year-old male developed shortness of breath 5 days after receiving the second dose of Pfizer vaccine presented multiple times to urgent care, primary care physician office, and emergency room and had been misdiagnosed with bronchitis and allergies. Eventually after several weeks he was admitted due to worsening dyspnea and got echocardiography which showed an EF of 15% and cardiac catheterization did not reveal significant obstruction of coronary arteries. He was successfully diuresed and was discharged home symptom-free. We aim to increase awareness of this

rare side effect of the COVID mRNA vaccination so that it can be recognized early and treated promptly to avoid complications.

**Keywords:** Congestive heart failure; COVID-19; COVID-19 vaccine

### 1. Case Presentation

A 47-year-old male engineer who runs 1.5 miles daily and goes to the gym regularly lifting heavy weights presented to primary care physician (PCP) with a 3 day history of shortness of breath that was worse with exertion, lying flat, and improved with rest and sitting. He is a non-alcoholic, non-smoker with no previous medical or surgical history, and compliant with his annual PCP visits. He had received his second dose of the Pfizer COVID vaccine 5 days prior to his symptom onset. PCP suspected allergies, referred him to an allergist, went

to urgent care multiple times, tested negative for coronavirus disease 2019 (COVID-19), and was placed on steroids and bronchodilators for possible bronchitis and allergies without relief.

On post-vaccination week 5, he presented to the emergency room (ER) as his shortness of breath got worse. On physical exam, lungs are clear to auscultation, no murmurs or rubs, with no lower extremity swelling. He was tachycardic with a heart rate of 108, blood pressure of 139/88, tachypneic with a respiratory rate of 23, and oxygen saturation of 93% on room air. Electrocardiography (ECG) showed left bundle branch block (LBBB). Laboratory investigation showed normal cardiac enzymes, Troponin T, 5th Gen 13 ng/l (normal < 20), CPK 93 EnzU/L (normal < 174), CK-MB 2.9 ng/mL CK-Index 3.1, mildly elevated pro BNP 722 pg/mL (normal < 138), elevated D-Dimer 0.90 ugFEU/mL (normal < 0.49), white blood cell count  $10.4 \times 10^3/\text{mcL}$ . Chest x-ray and CT angiogram of chest showed no abnormality. As workup was negative for any acute abnormality, he was advised to follow up with his PCP for further workup and discharged from ER.

PCP referred him to a pulmonologist who performed a pulmonary function test (PFT) which was normal. So, he was referred to a cardiologist for further evaluation. On post-vaccination week 13, transthoracic echocardiography (ECHO) was done, which revealed left ventricle ejection fraction (LVEF) of 15%. Cardiologist gave him Lasix and lisinopril and scheduled him for a cardiac catheterization.

Meanwhile, his shortness of breath worsened, so he returned to ER on post-vaccination week 15. He had shortness of breath with minimal exertion, frequent awakenings during sleep, chest tightness, bilateral lower extremity swelling, and productive cough with pink-colored frothy sputum. He was tachycardic with a heart rate of 117, blood pressure of 117/87, tachypneic with a respiratory rate of 20, oxygen saturation of 96% on room air. Physical exam was positive for positive S3 gallop, bilateral crackles, and +2 bilateral lower extremity edema. Laboratory investigation on admission showed high Troponin T, 5th Gen 29 ng/l, CPK 266 EnzU/L, CK-MB 4.1 ng/mL CK-Index 1.5, elevated pro-BNP 2006 pg/mL, white blood cell count  $7.5 \times 10^3/\text{mcL}$ . ECG showed LBBB.

Chest x-ray showed pulmonary edema. Cardiac catheterization revealed minimal disease of the mid-left anterior descending artery (LAD), severely reduced LVEF of 15%, initial left ventricular end-diastolic pressure (LVEDP) of 26, and mild pulmonary hypertension with elevated wedge pressure of 25. Following his catheterization, he underwent further diuresis and developed marked hypotension requiring dopamine, dobutamine drip, and repeat cardiac catheterization was performed, revealing elevated LV filling pressures and wedge pressure of 30. His cardiac index was 1.6 on both cardiac catheterizations. Placed on inotropic support for 3 days with gradual symptomatic improvement. There was suspicion of post-vaccine myocarditis, but cardiac MRI revealed no evidence of active myocarditis. Given that it has been three months since his initial symptoms began, it is possible that we lost the window of opportunity to diagnose myocarditis. He was discharged from the hospital

symptom-free on medical therapy with aldactone, sacubitril, valsartan with a plan for close outpatient follow-up.

## 2. Discussion

Myocardial injury caused by vaccines is rare, however it has been recorded in the case of live-attenuated influenza, COVID-19, and smallpox vaccines [1-3]. Although the exact cause and mechanism of the myocardial injury are not known, there are some suggestions that post-vaccine lymphocytic infiltration can result in immune-mediated cardiac injury.

He developed dyspnea 5 days after the second Pfizer vaccine. Despite several visits to PCP, urgent care, ER, he was misdiagnosed with allergies and bronchitis. Immune-mediated cardiac damage was not considered. He suffered for several months due to delay in performing appropriate diagnostic tests negatively impacting his quality of life. A more timely diagnosis could have resulted in a rapid recovery.

The relationship of the patient's presentation 5 days post-vaccine administration suggests but does not prove, the vaccine may be linked to the patient's congestive heart failure (CHF). However, it should be emphasized that the average yearly incidence of CHF in men aged 45-54 years per 1000 is 2. As a result, it's also possible that this patient's diagnosis was entirely coincidental.

The main objective of this case is to emphasize rare adverse effects of COVID-19 vaccine-associated myocardial injury so that post-vaccination symptoms are assessed appropriately and promptly. Cardiac involvement in COVID-19 infection [4] is well recognized, with manifestations ranging from myocardial injury to cardiogenic shock. There is a higher risk of myocardial injury from COVID-19 itself than there is from the vaccine. We want to raise awareness of this side effect without discouraging people from receiving COVID-19 vaccination, which has a well-established efficacy and safety profile [5].

## References

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