

## Myocarditis following administration of COVID-19 Vaccine: Should we be worried?

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*Respected Madam*, The COVID-19 vaccines have raised scepticism surrounding their accelerated approval due to their suspected adverse side effects.<sup>1</sup> Recently emerging clinical cases such as flu, fever, tachycardia, Bell's palsy, and swelling of the lymph nodes have further heightened public distrust. Interestingly, the United States Food and Drug Administration has recently announced an inflammatory heart disease, Myocarditis, as a potential risk of the Pfizer-BioNTech COVID-19 vaccine.

In efforts to find an association between the Pfizer vaccine and Myocarditis, researchers recently carried out extensive clinical trials; two new studies tracked cases having biomarker evidence of myocardial injury and Cardiac Magnetic Resonance Imaging.<sup>2,3</sup> Moreover, the United States Centers for Disease Control and Prevention (CDC) has recorded 323 confirmed cases of myocarditis, most documented within a week after each patient had received the Pfizer-BioNTech COVID-19 vaccine.<sup>4</sup>

A recent emergent theory suggests a cytokine response as the leading cause of myocarditis; the immune system identifies the mRNA in the vaccine as an antigen, leading to the activation of proinflammatory cascades and immunological pathways. The expression of cytokines and activation markers is due to the exposure of the dendritic cells to mRNA, which eventually causes inflammation of the heart muscle.<sup>4</sup>

Furthermore, according to the CDC, the myocarditis is mainly observed in male adolescents and young adults, more often after getting the second dose of the COVID-19 vaccine. A week after administering the vaccine, symptoms such as chest pain, shortness of breath, and tachycardia may appear, which tend to resolve following conservative treatment with nonsteroidal anti-inflammatory drugs.<sup>3</sup>

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Despite the previously mentioned occurrences of myocarditis after administration of the Pfizer-BioNTech vaccine, we would like to highlight the results of a large-scale cohort study in Israel with 2.5 million participants, where the estimated incidence of myocarditis after the administration of the Pfizer vaccine was only 2.13 cases per 100,000 persons.<sup>5</sup> These statistics allow us to draw the readers' attention towards the benefits of the COVID-19 vaccination, which outweigh potential adverse risks such as Myocarditis. The Pfizer-BioNTech vaccine has proven to be 95% effective and to keep track of other possible complications, patients are advised to report to the Vaccine Adverse Event Reporting System (VAERS) to document any unusual side effects.<sup>(4)</sup> Despite the few reported complications, we would further like to emphasize the importance of population-wide vaccination to overcome the COVID-19 pandemic with a minimum mortality rate.

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