

## Symptomatology, prognosis and clinical findings of myocarditis as an adverse event of COVID-19 mRNA vaccine: a systematic review

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**Background:** Myocarditis, an inflammation of the myocardium in the absence of ischemic injury, may be caused by viruses, drugs, and vaccines. The Myocarditis following COVID-19 vaccinations is most commonly seen in young adult males and commonly after the second dose of the mRNA vaccine. It usually presents with chest pain, dyspnoea, palpitations but has a diverse clinical presentation and varied therapeutic response. We aim to systematically collate the symptomatology, prognosis, and clinical findings of COVID-19 vaccine adverse events causing Myocarditis.

**Method:** Following the PRISMA statement 2020, a systematic search was conducted to isolate confirmed cases of COVID-19 vaccine-induced Myocarditis. By applying the BOOLEAN logic, the following keywords were used: COVID-19, SARS-CoV-2, Myocarditis, Mortality. Four databases were searched from January 2021 through August 2021: PubMed, Science Direct, Google Scholar, and Cochrane Library; the reference lists of screened studies were searched as well (umbrella methodology).

### Results:

In total, 12 case reports, 10 case series and 1 cohort study with a total of 107 patients were included in the final analysis. A total of 101 male patients were recorded, and 6 were female showing male dominance. The mean age of all participants was 24.73 years (SD = 13.18), ranging from 14 to 70. The most common presenting symptoms were chest pain (47.66%), fever (35.51%), and myalgia (25.23%). Lab findings showed elevated Troponin I, CRP, and ESR levels in the majority of patients.

ECG was abnormal in most of the patients, which include sinus rhythm (24%), ST-elevation (42.05%) and T wave inversion (13.08%). Echo findings include decreased Ejection fraction in 19.62% of patients while 13.08% of patients having a hypokinetic left ventricular wall. Further, CMR finding suggestive of confirmed myocarditis cases in 36% patients while rest are suspected one. Overall mortality(1.86%) was low among patients.

### Conclusion:

There is increasing evidence for Myocarditis as a rare adverse event of COVID-19 mRNA vaccination in young adults. This evidence is strongest amongst young male patients. The majority of the patients complain of chest pain and fever. In lab findings Troponin I, CRP and ESR are usually increased and ST elevation is common in the ECG. This entity is mainly treated with nonsteroidal anti-inflammatory drugs, Colchicine, Beta-blockers, ACE inhibitors, Steroids. However, prognosis and outcomes are favourable with a very low mortality rate.