



## Short communication

## Myocarditis following COVID-19 vaccination – A case series

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## ABSTRACT

There have been reports of myocarditis following COVID-19 vaccination. We surveyed all hospitalized military personnel in the Israeli Defense Forces during the period of the COVID-19 vaccination operation (12/28/2021–3/7/2021) for diagnosed myocarditis. We identified 7 cases of myocarditis with symptoms starting in the first week after the second dose of COVID-19 Pfizer-BioNTech vaccine. One case of myocarditis diagnosed 10 days after the second dose of the vaccine was not included. These 8 cases comprise of all events of myocarditis diagnosed in military personnel during this time period. All patients were young and generally healthy. All had mild disease with no sequelae. The incidence of myocarditis in the week following a second dose of the vaccine was 5.07/100,000 people vaccinated. Due to the nature of this report no causality could be established. Clinicians should be aware of the possibility of myocarditis following Pfizer-BioNTech vaccination. True incidence rates should be further investigated.

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## 1. Introduction

Myocardial injury has been shown to be prevalent in hospitalized COVID-19 patients, reaching up to 36% of them.[1] The pathogenetic pathway of this myocardial injury in COVID-19 patients is not yet determined, but evidence supporting direct infection of myocytes or epithelial cells are sparse to lacking, and it is thought that cardiac injury might occur due to inflammatory system hyperactivation and release of inflammatory mediators.[2] Myocardial injury has also been observed in recovered COVID-19, PCR negative, patients. This might be part of the Multisystem Inflammatory Syndrome in Adults (MIS-A) or as a standalone phenomenon. [3,4].

Recent studies have reported on myocarditis events following COVID-19 vaccination. Marshall and colleagues described 7 cases of myocarditis in adolescents within 4 days following the second dose of the Pfizer-BioNTech COVID-19 vaccine. [5] Montgomery and colleagues reported on 23 cases of myocarditis in the US military following a second dose of the Pfizer-BioNTech COVID-19 vaccine. [6] they concluded that the incidence of myocarditis after COVID-19 was higher than expected in comparison to incidence following vaccination. Abu Mouch and colleagues reported on 6 myocarditis patients hospitalized in an Israeli hospital after a second dose of Pfizer-BioNTech vaccination, 5 of them within 72 h of the vaccination. [7] Larson and colleagues reported on 8 cases of

myocarditis in an Italian hospital. [8] It is worth mentioning that one patient in their report presented with myocarditis after the first dose of the vaccine, but that patient previously recovered from COVID-19. Rosner and colleagues reported on 7 cases of myocarditis after COVID-19 vaccination [9]. Kim and colleagues report on 4 cases of myocarditis following COVID-19 vaccination, identified during a study researching vaccine associated myocarditis. [10] it is noteworthy that one of the cases reported in their article was a 70 year old female, the only female in all articles mentioned here.

On March 1st 2021, the Israeli Ministry of Health published incidence data on myocarditis following COVID-19 vaccinations. [11] The incidence rate of myocarditis in the 90 days following the second dose of the vaccine was 6.7 per 1,000,000, whereas the incidence following the first dose was much lower (0.6/1,000,000).

The Israeli Defense Forces (IDF) have provided COVID-19 vaccinations to its personnel, in a dedicated campaign that started on the 28th of December 2020. All vaccines used were of Pfizer-BioNTech manufacture. In this time frame more 158,000 IDF personnel received a single dose, and 138,000 received the second dose of the vaccine. In this study we monitored all personnel vaccinated up until March 1th 2021 and up to a week post vaccination for the diagnosis of myocarditis. Therefore, the follow up period ended on March 7th 2021.

The IDF Medical Corps have a robust and comprehensive monitoring system of hospitalized personnel. This ensures that no soldier is hospitalized without the Medical Corps knowledge and

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