Letters

RESEARCH LETTER

Myocarditis Following a Third BNT162b2 Vaccination Dose in Military Recruits in Israel

Vaccination has limited SARS-CoV-2 spread and prevented major illness and death during the COVID-19 pandemic.[1] However, certain adverse events, such as an increased incidence of myocarditis, particularly in young men, have been associated with vaccination with the BNT162b2 mRNA vaccine (Pfizer-BioNTech).[2,3]

On July 30, 2021, the Israeli Ministry of Health approved the administration of a third vaccine dose for the general population in response to increasing numbers of COVID-19 cases. We assessed whether a third vaccine dose was associated with the risk of myocarditis.

Methods | On August 15, 2021, the Israel Defense Forces (IDF) began administering a third dose of COVID-19 vaccine, using the BNT162b2 vaccine only. This study included all military personnel vaccinated with a third dose of BNT162b2 until September 30, 2021, and diagnosed with myocarditis up to October 14, 2021. All suspected myocarditis cases in the IDF are referred to the hospital. Diagnosis was based on laboratory, electrocardiogram, echocardiography, and cardiac magnetic resonance imaging findings. All reports were reaffirmed by an independent cardiologist. Based on aggregated data, we calculated the incidence of myocarditis in the week and 2 weeks following vaccination. 95% CIs were estimated using OpenEpi (version 3).

The IDF institutional review board approved this study and waived the requirement for written informed consent based on preserving participants' anonymity. All data were based on clinical records, without additional tests.

Results | During the BNT162b2 booster vaccination rollout, 126 029 IDF members were vaccinated. Of the men, 79% were 18 to 24 years old and of the women, 90% were 18 to 24 years old. The age and sex distribution of vaccine recipients was similar to that of the general IDF population.

During follow-up, 9 members, all young men, were diagnosed with myocarditis. One case occurred after COVID-19 and was excluded. The 8 remaining cases had a negative result on a SARS-CoV-2 reverse transcriptase–polymerase chain reaction test at the time of diagnosis. Four developed symptoms within a week of vaccination, 3 had symptoms beginning 8 to 10 days after vaccination, and 1 developed symptoms more than 2 weeks after vaccination (and thus was excluded from analysis). All cases were mild, without arrhythmia or signs of congestive heart failure. All remained without residual cardiac injury on hospital discharge.

The incidence rates of myocarditis in the week and 2 weeks following a third vaccine dose were 3.17 (95% CI, 0.64-6.28) and 5.55 (95% CI, 1.44-9.67) per 100 000 vaccines given, respectively. Because all myocarditis cases were in young men (18-24 years old), we estimated the incidence for this specific population to be 6.43 (95% CI, 0.13-12.73) and 11.25 (95% CI, 2.92-19.59) per 100 000 vaccines given in the week and 2 weeks after a third vaccine dose, respectively.

Discussion | This study found a low risk of myocarditis after a third dose of BNT162b2 in Israeli military recruits. The incidence was lower than observed a week after a second dose of the vaccine in a similar Israeli military population (5.07 per 100 000 vaccines).[4] However, the myocarditis incidence for 18- to 24-year-old men was higher than observed for a US male population (5.243 per 100 000 vaccines).[3] The incidence of myocarditis following the second dose of the vaccine varies according to follow-up times in studies[2-6] and the definition of myocarditis used. Therefore, comparisons should be made with caution.

Study limitations included the small number of diagnosed cases and inclusion primarily of young men. However, the study included the entire IDF vaccinated population, which is representative of the IDF population in age and sex distribution. Because the study included only cases diagnosed in the hospital, there is a chance for underdiagnosis, and the incidence of myocarditis may be higher. However, the risk of underascertainment is likely low because awareness of postvaccination myocarditis was high as a result of media coverage and because all suspected myocarditis cases were referred for hospital assessment.

The cause of the lower incidence of myocarditis following a third dose in comparison with the incidence after the second dose requires future research.

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