

## Correspondence on ‘BNT162b2 vaccine-associated myo/pericarditis in adolescents’

Dear Editor,

We would like to share ideas on the publication ‘BNT162b2 vaccine-associated myo/pericarditis in adolescents: A Stratified Risk-Benefit Analysis.’<sup>1</sup> Krug et al. reported a comprehensive analysis of an original study and concluded that ‘Our findings strongly support individualized paediatric COVID-19 vaccination strategies, which weigh protection against severe disease vs. risks of vaccine-associated myo/pericarditis. Research is needed into the nature and implications of this adverse effect and immunization strategies, which reduce harm in this overall low-risk cohort.’<sup>1</sup> We agree that COVID-19 can have negative side effects, with myo/pericarditis being one among them. Krug et al. analyzed data from the Vaccine Adverse Event Reporting System (VAERS) in this investigation. The current investigation looked at comorbidity and clinical history, and other factors. The clinical condition in a COVID-19 vaccine recipient with myo/pericarditis may or may not be related to the vaccine. The affected adolescent's pre-vaccination health/immune status is frequently unknown, and there may be a consequence of an underlying health problem. There is no direct examination of the background disease, according to VAERS. There is also the possibility of a coexisting medical condition. Dengue fever, for example, can occur in a vaccine recipient<sup>2</sup> and cause a heart problem.<sup>3</sup> The VAERS retrospective data may not be able to detect the silent underlying disease

or a concomitant medical condition. A history of past infection, for example, cannot rule out previous asymptomatic COVID-19 infection or another silent concomitant medical issue. On the other hand, there might also be an underestimation of myo/pericarditis because the vaccine recipients might not have reported chest pain after the vaccination. Currently, there is no standard investigation on myo/pericarditis after the vaccination. In general, there are limited data on the incidence of myo/pericarditis after vaccination (Table 1).<sup>4–10</sup> In the pre-COVID-19 era, the reported incidence of myopericarditis among healthy persons without vaccination was equal to 0.95 cases per 100,000.<sup>4</sup> Focussing on vaccinated persons, an incidence equal to 5.5 per 10,000 was reported in a study on smallpox vaccination.<sup>5</sup> However, those studies did not cover the adolescent group. The specific data on myo/pericarditis in adolescents are limited.

Based on these considerations, the actual incidence of myo/pericarditis following COVID-19 vaccination may be different than what has been found. Given the aforementioned considerations, the exact incidence should be further studied. Most likely, the incidence of myo/pericarditis might be a result of the vaccination. Almost all cases have symptoms and abnormal cardiac biomarkers within 5 days after vaccination. Although there is a low incidence of myo/pericarditis, it is still necessary to recognize for future ‘quality of life’, which has never been

TABLE 1 Available data on the incidences of myo/pericarditis

Scenarios	Type of persons studied	Incidences (pericarditis per 100,000)
1. Pre-COVID era, healthy population <sup>4</sup>	Deployed military member from USA	0.95
2. Pre-COVID era, after smallpox vaccination <sup>5</sup>	Adults 25–70 years from USA	55
3. Pre-COVID era, after influenza vaccination <sup>6</sup>	Adults from USA	0
4. Reported incidences after covid infection <sup>7,8</sup>	All age groups from Australia, UK, USA and Denmark	300–500
5. Reported incidences after covid vaccination from Krug et al. <sup>1</sup>	Adolescents from USA	9.3–16.2
6. Reported incidences after covid vaccination from other studies <sup>9,10,12</sup>	Age group 12–39 years from China, Singapore and USA	1.3–59.8

determined yet. In previous reports, there is no long-term complication of myo/pericarditis after smallpox or influenza vaccination.<sup>5,6</sup> For COVID-19 vaccination-associated myo/pericarditis, there is no report on the long-term consequence. However, most reported cases of COVID-19 vaccination-associated myo/pericarditis are not severe, and the prognosis is good; hence, there should be no long-term complication. Finally, there are other potential complications of the vaccine, such as effects on the dermatological and hematological system, that may have an additional impact. Nevertheless, the incidence of other important adverse events after COVID-19 vaccination is lower than that of a cardiac problem (for example, the incidence of anaphylaxis is only 0.5 per 100,000<sup>11</sup>). Based on the available data (Table 1), the reported incidence of COVID-19 vaccination-associated myo/pericarditis is significantly lower than the incidence of COVID-19-related myo/pericarditis. In the authors' opinion, the COVID-19 vaccine still has a benefit over risk. It is no doubt that the mass vaccination should continue. Nevertheless, further studies on the efficacy and safety of COVID-19 vaccination are still required.

#### CONFLICT OF INTEREST

None.

Pathum Sookaromdee<sup>1</sup>  
Viroj Wiwanitkit<sup>2</sup>

<sup>1</sup>Private Academic Consultant, Bangkok, Thailand

<sup>2</sup>Dr DY Patil University, Pune, India

#### Correspondence

Pathum Sookaromdee, Private Academic Consultant,  
Bangkok Thailand.

Email: [pathumsook@gmail.com](mailto:pathumsook@gmail.com)

#### REFERENCES

1. Krug A, Stevenson J, Høeg TB. BNT162b2 vaccine-associated myo/pericarditis in adolescents: a stratified risk-benefit analysis. *Eur J Clin Invest*. 2022:e13759. doi:10.1111/eci.13759. Online ahead of print.
2. Kebayoon A, Wiwanitkit V. Dengue after COVID-19 vaccination: possible and might be missed. *Clin Appl Thromb Hemost*. 2021;27:107602962110472.
3. Araiza-Garaygordobil D, García-Martínez CE, Burgos LM, et al. Dengue and the heart. *Cardiovasc J Afr*. 2021;32(5):276-283.
4. Lin AH, Phan HAL, Barthel RV, et al. Myopericarditis and pericarditis in the deployed military member: a retrospective series. *Mil Med*. 2013;178(1):18-20.
5. Morgan J, Roper MH, Sperling L, et al. Myocarditis, pericarditis, and dilated cardiomyopathy after smallpox vaccination among civilians in the United States, January–October 2003. *Clin Infect Dis*. 2008;46(Suppl 3):S242-S250.
6. Engler RJM, Nelson MR, Collins LC Jr, et al. A prospective study of the incidence of myocarditis/pericarditis and new onset cardiac symptoms following smallpox and influenza vaccination. *PLoS One*. 2015;10(3):e0118283.
7. Buckley BJR, Harrison SL, Fazio-Eynullayeva E, Underhill P, Lane DA, Lip GYH. Prevalence and clinical outcomes of myocarditis and pericarditis in 718,365 COVID-19 patients. *Eur J Clin Invest*. 2021;51(11):e13679.
8. Bhatia KS, Gaal W, Kritharides L, et al. The incidence of cardiac complications in patients hospitalised with COVID-19 in Australia: the AUS-COVID study. *Med J Aust*. 2021;215(6):279.
9. Bozkurt B, Kamat I, Hotez PJ. Myocarditis with COVID-19 mRNA vaccines. *Circulation*. 2021;144(6):471-484.
10. Li M, Yuan J, Lv G, Brown J, Jiang X, Lu ZK. Myocarditis and pericarditis following COVID-19 vaccination: inequalities in age and vaccine types. *J Pers Med*. 2021;11(11):1106.
11. Klein NP, Lewis N, Goddard K, et al. Surveillance for adverse events after COVID-19 mRNA vaccination. *JAMA*. 2021;326(14):1390-1399.
12. Yap J, Tham MY, Poh J, et al. Pericarditis and myocarditis after COVID-19 mRNA vaccination in a nationwide setting. *Ann Acad Med Singap*. 2022;51(2):96-100.