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Beyond mental stress-induced myocardial ischemia following the COVID-19 vaccine

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As of January 5, 2023, there have been 657,430,133 confirmed cases of COVID-19, including 6,676,645 deaths, reported to World Health Organization [1]. To control COVID-19 outbreak, effective vaccines against SARS-CoV-2 has become the most measures. Robust evidence also indicates the clinical efficacy of COVID-19 vaccine in the prevention of SARS-CoV-2 spread and COVID-19 progress. Although the tolerability of COVID-19 vaccine have been well demonstrated, many people still did not receive COVID-19 vaccine due to the concerns about its associated adverse events (AEs). In the 2022 September issue of *BioMedicine* (Taipei), Palmer reported that many vaccine-related AEs could be caused by mental stress-induced myocardial ischemia (MSIMI) [2]. As the author stated, MSIMI is a clinical condition in which emotional distress causes vasoconstriction and may further result in hyperpnea, postural faintness, light headedness, dizziness, and a smell or taste disorder [3–5]. Although MSIMI may play a potential role in coronavirus disease 2019 (COVID-19) vaccine-related AEs, we should be concerned about many other issues related to the serious AEs caused following COVID-19 vaccination.

First, thrombosis with thrombocytopenia syndrome (TTS), a new clinical entity associated with adenovirus-vectored vaccines, is a severe and life-threatening complication [6,7]. TTS after COVID-19 vaccination mimics the clinical image of autoimmune heparin-induced thrombocytopenia, which involves the formation of anti-PF4 antibodies and the activation of platelets, leading to thrombocytopenia and thrombin-mediated clotting [6]. Cerebral venous

thrombosis, which encompasses thrombosis in dural sinus veins, cortical veins, and deep venous structures, is potentially the most serious form of TTS [7]. Although most reported cases developed within two weeks after adenovirus-vectored vaccines, TTS were also rarely documented after vaccination with mRNA vaccines [6]. Non-heparin anticoagulant or a direct oral anticoagulant with intravenous immunoglobulins is the standard treatment. Additionally, systemic corticosteroid or plasma exchange could be recommended if clinically indicated [7].

Second, although the incidence of acute myocarditis/pericarditis following COVID-19 vaccination is extremely low, we should keep alert to this rare complication, particularly in young adults [8,9]. The clinical manifestations of COVID-19 vaccine-related inflammatory heart conditions included chest pain, shortness of breath, fever, elevated cardiac enzymes and diffuse ST-segment elevation on electrocardiogram. Sometimes, cardiac magnetic resonance imaging can demonstrate the presence of myocardial edema on T2 mapping and late gadolinium enhancement and can help to make a diagnosis [9]. After treatment with nonsteroidal anti-inflammatory drugs or colchicine with corticosteroids for refractory cases, most patients had a favourable clinical recovery [9].

Finally, the risk of AE could vary according to different types of COVID-19 vaccines [10]. One study using vaccine adverse event reporting system data from the U.S. FDA website assessed the risk of serious AEs following immunization (AEFI), including thromboembolism, haemorrhage, thrombocytopenia, cardiac arrhythmia, hypertension, and hepatotoxicity, among adult individuals who were

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COVID-19 vaccinated [10]. During the study period, a total of 445,926, 167,457, and 535,126 cases of AEFI were reported after vaccination with BNT162b2, Ad26.COV2. S, and mRNA-1273, respectively, and the frequency of death was statistically lower for Ad26.COV2. S (2.06 per 1,000, 345/167,457) than the other two vaccines - BNT162b2 (4.40 per 1,000, 1,963/445,926) and mRNA-1273 (3.88 per 1,000, 2,077/535,126) ($p < 0.05$) [10]. In contrast, Salter et al. conducted active vaccine safety surveillance from 130 community pharmacies that were in Australia and integrated with AusVaxSafety, but they found that mRNA-1273 was the most reactogenic and was associated with higher AEFI proportions across primary doses 2 and 3 and booster doses than the other three COVID-19 vaccines – BNT162b2, ChAdOx1 and NVX-CoV2373 [11].

In conclusion, in addition to MSIMI, there were many safety issues regarding COVID-19 vaccines. All these findings indicated the necessity of continuous monitoring and surveillance of COVID-19 vaccine-related AEs during the pandemic.

References

- [1] World Health organization. <https://covid19.who.int/>. [Accessed 6 January 2023].
- [2] Palmer RDJB. Covid 19 vaccines and the misinterpretation of perceived side effects clarity on the safety of vaccines. *Biomedicine* 2022;12(3):1–4.
- [3] Taylor S, Asmundson GJG. Immunization stress-related responses: implications for vaccination hesitancy and vaccination processes during the COVID-19 pandemic. *J Anxiety Disord* 2021;84:102489.
- [4] Taneja I, Medow MS, Glover JL, Raghunath NK, Stewart JM. Increased vasoconstriction predisposes to hyperpnea and postural faint. *Am J Physiol Heart Circ Physiol* 2008;295:H372–81.
- [5] Lechien JR, Diallo AO, Dachy B, Le Bon SD, Maniaci A, Vaira LA, et al. COVID-19: post-vaccine smell and taste disorders: report of 6 cases. *Ear Nose Throat J* 2021;1455613211033125.
- [6] Lai CC, Ko WC, Chen CJ, Chen PY, Huang YC, Lee PI, et al. COVID-19 vaccines and thrombosis with thrombocytopenia syndrome. *Expert Rev Vaccines* 2021;20:1027–35.
- [7] Guetl K, Raggam RB, Gary T. Thrombotic complications after COVID-19 vaccination: diagnosis and treatment options. *Biomedicine* 2022;10.
- [8] Durand J, Dogné JM, Cohet C, Browne K, Gordillo Maranon M, Piccolo L, et al. Safety monitoring of COVID-19 vaccines: perspective from the European Medicines Agency. *Clin Pharmacol Ther* 2022. <https://doi.org/10.1002/cpt.2828>.
- [9] Furqan M, Chawla S, Majid M, Mazumdar S, Mahalwar G, Harmon E, et al. COVID-19 Vaccine-related myocardial and pericardial inflammation. *Curr Cardiol Rep* 2022;24:2031–41.
- [10] Yan MM, Zhao H, Li ZR, Chow JW, Zhang Q, Qi YP, et al. Serious adverse reaction associated with the COVID-19 vaccines of BNT162b2, Ad26.COV2.S, and mRNA-1273: gaining insight through the VAERS. *Front Pharmacol* 2022; 13:921760.
- [11] Salter SM, Li D, Trentino K, Nissen L, Lee K, Orlemann K, et al. Safety of four COVID-19 vaccines across primary doses 1, 2, 3 and booster: a prospective cohort study of Australian community pharmacy vaccinations. *Vaccines (Basel)* 2022;10.