

## LETTER TO EDITOR

# Response to: Note the distinction between myocarditis, novel coronavirus myocarditis and COVID-19 vaccine-associated myocarditis

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Dear Editor,

We are delighted that Dr Xianqiang Yu has written to us with a comment on our article about myocarditis after coronavirus disease 2019 (COVID-19) messenger RNA (mRNA) vaccines.<sup>1</sup> It has recently been reported that myocarditis can be caused by COVID-19 and COVID-19 mRNA vaccines.<sup>1,2</sup> As Dr Yu stated, COVID-19 vaccine-associated myocarditis has a different clinical course and mechanism compared to COVID-19 myocarditis. Suspected cases of vaccine-associated myocarditis are characterized by onset within 2 weeks of vaccination in healthy young men. The cases of histologically confirmed fulminant myocarditis after COVID-19 mRNA vaccines show an inflammatory infiltrate predominantly composed of T-cells, macrophages, eosinophils, B cells and plasma cells,<sup>3</sup> which is suggested to be associated with autoimmunity and allergies. It is important to distinguish between these two clinical entities. From the clinical perspective of vaccine-associated myocarditis, young men often show an early repolarization pattern on electrocardiograms (ECGs), making it difficult to diagnose accurately. Transthoracic echocardiogram (TTE) showed no remarkable findings in our cases. Therefore, we emphasize that the diagnosis of myocarditis requires multimodality, including high-sensitivity troponin, serial ECGs, global longitudinal strain with TTE and cardiac magnetic resonance imaging.

Finally, it is obvious that a final diagnosis should be made after ruling out the other potential aetiologies by considering a variety of types of infectious myocarditis (i.e. viral- (including SARS-CoV-2), bacterial- and fungal-induced myocarditis, etc.)

and non-infectious myocarditis mainly caused by immunological pathways (i.e. drug-induced myocarditis, cardiac sarcoidosis, eosinophilic myocarditis and giant cell myocarditis).<sup>4</sup>

Conflict of interest. None declared.

## References

1. Koizumi T, Awaya T, Yoshioka K, Kitano S, Hayama H, Amemiya K, et al. Myocarditis after COVID-19 mRNA vaccines. *QJM* 2021; **114**:741–4.
2. Daniels CJ, Rajpal S, Greenshields JT, Rosenthal GL, Chung EH, Terrin M, et al.; Big Ten COVID-19 Cardiac Registry Investigators. Big Ten COVID-19 Cardiac Registry investigators. Prevalence of clinical and subclinical myocarditis in competitive athletes with recent SARS-CoV-2 infection: results from the Big Ten COVID-19 Cardiac Registry. *JAMA Cardiol* 2021; **6**: 1078–87.
3. Verma AK, Lavine KJ, Lin CY. Myocarditis after Covid-19 mRNA Vaccination. *N Engl J Med* 2021; **385**:1332–4.
4. Caforio AL, Pankuweit S, Arbustini E, Basso C, Gimeno-Blanes J, Felix SB, et al. European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. Current state of knowledge on aetiology, diagnosis, management, and therapy of myocarditis: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. *Eur Heart J* 2013; **34**:2636–48. 2648a–2648d.

Submitted: 31 October 2021

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