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## The importance of recognizing cerebral venous thrombosis following anti-COVID-19 vaccination

To the Editor.

In March 2021, the reporting of cases of thrombosis post-COVID-19 vaccine AstraZeneca raised safety concerns and determined the temporary suspension of vaccinations in some countries in Europe [1]. On the 18<sup>th</sup> of March, EMA published its preliminary review of cases concluding that “the benefit of the vaccine in combating the still widespread threat of COVID-19 (which itself results in clotting problems and may be fatal) continue to outweigh the risk of side effects” [2]. On the same day, a one-week campaign was launched in Italy through the secretariat of the Hospital Neurosciences Society (SNO) to gather all cases of cerebral venous thrombosis within one month of anti-COVID-19 vaccine administration. The purpose of this campaign is to identify, through an exhaustive collection of post-COVID-19 vaccine cerebral venous thrombosis cases, a common pattern among demographic, clinical, laboratory and risk factors, to support a possible causal link between COVID-19 vaccine and cerebral thrombosis.

The most remarkable findings of the cases observed (Table 1) are early platelet consumption (82%), extra-cerebral thrombosis (73%) and poor outcome (only one patient without neurological deficit) with high mortality (45%), compared to expected mortality of less than 5% in patients with cerebral sinus thrombosis not exposed to the COVID-19 vaccine [3]. Clinical manifestation appeared during the first 11 days after the vaccination.

These issues led to speculation that COVID-19 vaccine might determine cerebral venous thrombosis due to an immune thrombocytopenia [4] as described in SARS-CoV-2 infection, through molecular mimicry between virus and platelet antigens [5]. Similarly, after vaccination, the antibodies produced against the spike proteins might cross-react with specific antigens expressed on the platelet surface. The reason why such a chain of events sporadically occurs remains obscure.

Therefore, cerebral venous thrombosis after COVID-19 vaccination can be the first manifestation of a much more complex disorder mimicking heparin-induced thrombocytopenia. An inclusive awareness of the clinical and laboratory features of these events plays a crucial role

in order to undertake all the possible measures to prevent the dramatic consequences of immune thrombocytopenia. Although from these case series there is no evidence of any predisposing conditions to identify patients at risk, the widespread knowledge of this possible severe adverse event of COVID-19 vaccination is already a valid prevention strategy.

### Declaration of Competing Interest

None.

### Appendix

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in the early identification of patients at their first clinical manifestation,

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