Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editors

Impact of SARS-CoV-2 vaccines on the nervous system

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Letter to the Editor

We read with interest the article by Goulart Correa et al. about three patients experiencing neurological side effects after the first dose of the AstraZeneca vaccine.[1] Patient-1 was a 64yo male who experienced an ischemic stroke two days after vaccination.[1] Patient-2 was a 42yo male who experienced left-sided facial palsy seven days after the vaccination.[1] Patient-3 is a 65yo male who experienced transverse myelitis 8d after being vaccinated.[1] The study is appealing but raises concerns.

Cardiovascular risk factors not assessed in patient-1 were atrial fibrillation and myocarditis. We should be told if the patient underwent long-term ECG monitoring on a stroke unit, to asses if there was paroxysmal or permanent atrial fibrillation. The frequency of atrial fibrillation increases with age why it cannot be excluded that rather atrial fibrillation than the vaccination was causative. Though transthoracic echocardiography was normal,[1] myocarditis cannot be excluded. Diagnosing myocarditis requires a cardiac MRI with contrast medium or *endo*-myocardial biopsy. Myocarditis has been repeatedly reported as a complication of SARS-CoV-2 vaccinations[2] and can be complicated not only by arrhythmias or systolic dysfunction, but also by atrial or intra-ventricular thrombus formation. Another cause of ischemic stroke not addressed in patient-1 was autoimmune haemolytic anemia triggered by SARS-CoV-2 vaccination.[3] We should be told if the red blood cell counts were normal or not. A fourth cause of ischemic stroke not considered is intra-vascular thrombus formation. Thrombus formation after a SARS-CoV-2 vaccination may not only occur in the venous system but also in small or large arteries, including the aorta, carotid arteries, or the iliac arteries.[4] Though tests for thrombophilia were negative, we should be told if the D-dimer values were normal or not. Thrombus formation in SARS-CoV-2 vaccinated may also result from immune thrombocytopenia, why we should know if the thrombocyte counts were ever decreased during the post-vaccination phase.

Concerning patient-2 we should be told if the patient was seen by a neurologist and if there were neurological abnormalities other than the facial palsy. Mono- or poly-neuritis are common complications of SARS-CoV-2 infections,[5] but have been occasionally also reported after SARS-CoV-2 vaccinations.[6] Cranial nerve neuritis may be accompanied by affection of the peripheral nerves, why it is crucial to know if there were any sensory abnormalities, motor deficits, or autonomic dysfunction on clinical neurologic exam. Absence of a dissociation cyto-albuminique in the cerebro-spinal fluid (CSF) does not exclude a Guillain-Barre syndrome (GBS).

Regarding patient-3 it would be interesting to know if the cerebral MRI was normal or not. Not only extensive longitudinal transverse myelitis has been reported as a complication of SARS-CoV-2 vaccinations[7] but also acute, disseminated encephalomyelitis (ADEM).[8] ADEM may respond favorably in a similar way to steroids as isolated transverse myelitis.

Overall, the interesting study has limitations which challenge the results and their interpretation. Differentials of ischemic stroke need to be excluded in patient-1, GBS with cranial nerve involvement needs to be excluded in patient-2 and ADEM needs to be excluded in patient-3.

Ethical approval and consent to participate

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Consent for publication

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Availability of data and material

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CRediT authorship contribution statement

JF: design, literature search, discussion, first draft, critical comments, FS: literature search, discussion, critical comments, final approval.

Declaration of competing interest

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