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## Letter to the Editor

# Do not miss Bickerstaff encephalitis as a complication of SARS-CoV-2 vaccines <sup>☆</sup>

### Letter to the Editor

We read with interest the article by Yazdanpanah et al about a 37 years old male who developed quadraparesis, facial diplegia, dysphagia, respiratory insufficiency, drooling, nausea, and vomiting 1 month after the first dose of the whole virus Sinopharm vaccine [1]. A few days after the vaccination he became lethargic and developed intermittent myalgia why Guillain-Barre syndrome (GBS) was initially suspected [1]. Work-up for quadraparesis, respiratory insufficiency, and facial diplegia revealed multiple left-sided corticospinal tract lesions, why acute, disseminated encephalomyelitis (ADEM) was diagnosed [1]. Steroids resulted in complete resolution of muscle weakness within 10 days [1]. The study is appealing but raises concerns that need to be discussed.

We do not agree with the diagnosis ADEM. More likely than ADEM, the index patient suffered from GBS, subtype brainstem Bickerstaff encephalitis (BBE). Several arguments against the diagnosis ADEM can be raised. First, CSF investigations revealed dissociation cyto-albuminiquie (2 white blood cells, protein of 56 mg/dL) suggesting GBS [1]. Therefore the patient should have undergone nerve conduction studies (NCSs) to assess if there was a proximal demyelinating or axonal lesion. Second, the features found on cerebral magnetic resonance imaging do not comply with the diagnosis ADEM. ADEM usually presents with disseminated supra- and infratentorial lesions, including the spinal cord. However, no supratentorial or spinal cord lesions were detected. Third, BBE has been previously reported as a complication of SARS-CoV-2 vaccines [2]. Fourth, the unilateral cerebral lesion does not explain facial diplegia and quadraparesis. The T2-hyperintensity shown in Figure 1 is located in the left medulla,

corresponding with the T1-hypointense lesion in the left pons. Unilaterality of these lesions suggests that facial diplegia and quadraparesis were rather due to bilateral involvement of cranial nerves VII, IX, and X and the peripheral nerves than due to the unilateral affection of the pyramidal tract. Therefore, we should know if roots of cranial nerves VII, IX, X, and the peripheral nerves enhanced upon application of gadolinium, as has been previously demonstrated in patients with SARS-CoV-2 associated GBS plus cranial nerve involvement [3,4].

Tendon reflexes were described as preserved. However, we should know if tendon reflexes were diminished or exaggerated. Preserved tendon reflexes are no argument against GBS. Particularly in the early stages of GBS, tendon reflexes can be preserved. Tendon reflexes can be also preserved in BBE.

The course of lethargia and myalgia starting a few days after the vaccination remains unclear. Did these symptoms spontaneously disappear or did they persist until onset of quadraparesis?

An argument against a causal relation between quadraparesis and facial diplegia and the vaccination is the fairly long latency between vaccination and onset of muscle weakness.

Missing is a follow-up magnetic resonance imaging to study the evolution of the brainstem lesions. We should know if the corticospinal tract lesion disappeared upon administration of steroids, which would support the diagnosis ADEM [5].

Missing are NCSs of the facial nerves to see if facial diplegia was due to a central or peripheral lesion.

Overall, the interesting study has some limitations and inconsistencies that call the results and their interpretation into question. Clarifying these weaknesses would strengthen the

Abbreviations: ADEM, Acute disseminated encephalomyelitis; BBE, Brainstem Bickerstaff encephalitis; CSF, Cerebrospinal fluid; GBS, Guillain Barre syndrome; NCSs, Nerve conductuib studies.

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conclusions and could add value to the study. More likely than ADEM, the index patient had BBE.

### Author contribution

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

### Ethics approval

Approval was in accordance with ethical guidelines. The study was approved by the institutional review board.

### Patient consent statement

The consent was obtained from the patient. Consent for publication was also obtained from the patient.

### Availability of data

All data are available from the corresponding author.

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