



MRI Negative Myelitis Induced by Pfizer-BioNTech COVID-19 Vaccine

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Dear Editor,

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified in 2019 and is the causative agent of the worldwide Coronavirus disease 2019 (COVID-19) pandemic, which is associated with substantial mortality.^{1,2} The Pfizer-BioNTech COVID-19 vaccine was the first approved vaccine that exhibited 95% effectiveness against COVID-19.^{1,3} Although rare post vaccination neurological complications are well described.⁴ Here, we report a case of a male with transverse myelitis (TM) after receiving the second dose of the Pfizer-BioNTech COVID-19.

A 33-year-old male presented with 2 weeks of progressive weakness of the lower limbs. The complaints started 2 days after receiving his second dose of the Pfizer-BioNTech COVID-19. For the first 2 days he found it very difficult to walk, and he also noticed the sensation of incomplete emptying of the bladder and nocturnal low back pain. He did not have any relevant past medical history. He denied a history of infection or previous systemic complaints, illicit drug use, recent medications, travels, or any other epidemiological context. Since the symptoms persisted, he was admitted to the emergency room for evaluation. The neurological examination revealed mild paraparesis with a proximal muscle strengths of 4+ and 4 in the left and right legs, respectively. The Achilles reflexes were more brisk than the others. Superficial cutaneous-abdominal reflexes were absent and plantar reflexes were equivocal. There was a decreased thermic sensation below the T12 dermatomal level. An extensive workup evaluation was performed. Laboratory results (including autoimmune and infectious serologies, including for COVID-19) were negative. The findings of cervical, thoracic, and lumbar spine magnetic resonance imaging (MRI) were unremarkable (Fig. 1A, B and C). Additional brain MRI (Fig. 1D, E and F) did not produce any clinically relevant findings. A CSF study showed mononucleated pleocytosis (24 cells) and mild hyperproteinorhachia (56 mg/dL). CSF bacteriological cultures and PCR for neurotropic virus and *Borrelia burgdorferi* were negative. There was slight cerebral barrier function disorder, but the oligoclonal bands were negative. The symptoms of the patient gradually reduced without additional treatment, and he became asymptomatic, after 3 months of follow-up.

We report a case of a male who experienced a monophasic transitory neurological dysfunction compatible with TM after receiving the second dose of the Pfizer-BioNTech COVID-19 vaccine. Although no lesions were visible in spine MRI (note that imaging performed during the convalescent phase can miss a cord lesion⁵), there was a demonstration of CSF inflammation. Additionally, other possible etiologies (compressive, acute SNC infection, primary demyelinating diseases, malignancy, or systemic autoimmune) were excluded. The patient's clinical course was favorable and there was no need for any kind of treatment.

TM is a rare immune-mediated process that results in varying degrees of weakness, sensory alterations, and autonomic dysfunction. TM involves breakdown of the blood-brain barrier and pleocytosis of the CSF within a focal area of the spinal cord.⁴ Up to 40% of cases

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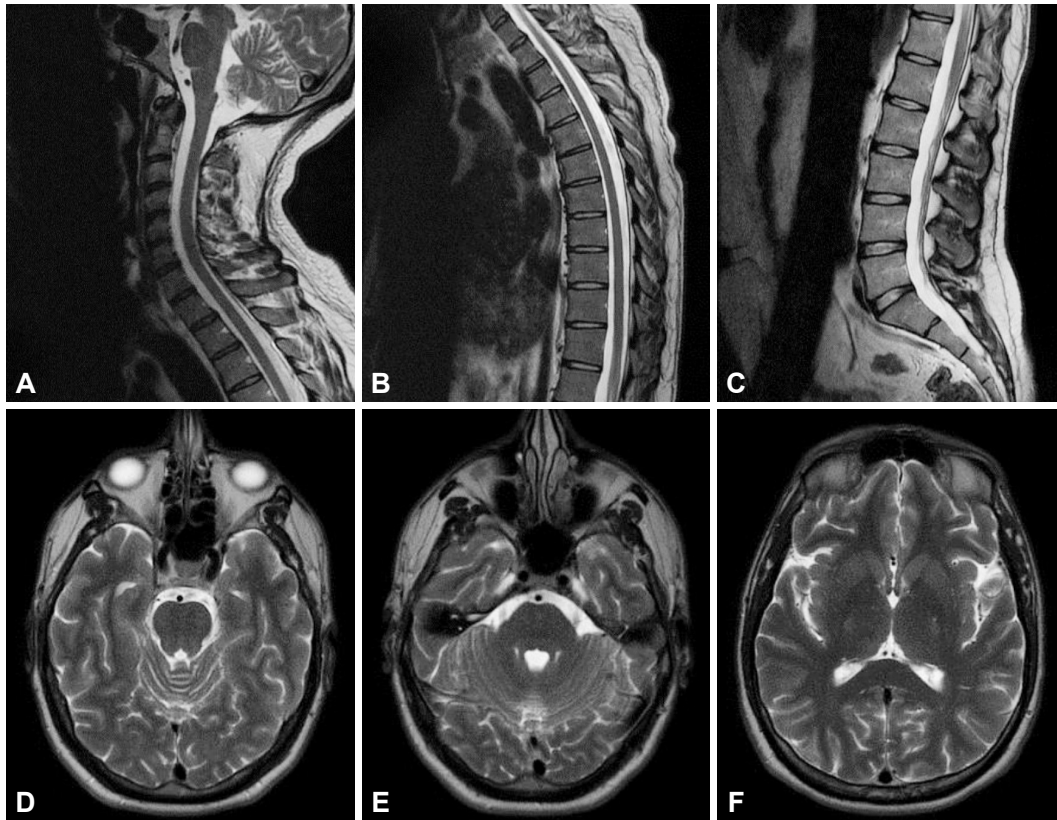


Fig. 1. The findings of T2-weighted MRI of the spinal cord (A-C; sagittal) and brain (D-F; axial) were unremarkable.

do not have relevant MRI findings.⁶ Several cases of TM have been reported after the administration of the different vaccines, including those for HBV, HPV, seasonal influenza, measles-mumps-rubella (MMR), polio, and diphtheria, with symptoms occurring from a few days to 3 months following inoculation.^{4,7} More recently, during the trial phase an association was found between the recombinant Oxford-AstraZeneca COVID-19 vaccine, and two instances of TM, but in one of those cases the association was likely to have been coincidental.^{2,8} After the beginning of mass vaccination, there was another case report of TM associated with the Oxford-AstraZeneca COVID-19 vaccine, with symptom onset occurring at 8 days after vaccine administration, which was responsive to intravenous methylprednisolone.⁹

Three mechanisms via which vaccines can induce TM have been proposed 1) molecular mimicry; 2) epitope spreading, or 3) polyclonal activation of B lymphocytes.⁴ Neurological side effects in clinical trials of the Pfizer-BioNTech COVID-19 vaccine were rare, and only included Bell's palsy.^{1,8} After the vaccine started to be rolled out around the world, one case of Guillain-Barré syndrome after the first dose of the Pfizer-BioNTech COVID-19 vaccine was reported.¹⁰ The technology underlying the Pfizer-BioNTech COVID-19 vaccine relies on messenger RNA (mRNA), and since the mRNA technique is

new in vaccine manufacturing, potential adverse effects are not yet known, especially neurological ones.¹ We hypothesize that the immune response to this vaccine triggered a transitory autoimmune process in our patient.

To our knowledge, this is the first reported case of TM after receiving the Pfizer-BioNTech. This case highlights that is essential to follow possible vaccine side effects in the real world, including neurological ones. However, it should be remembered that the risk of neurological complications or other adverse effects associated with COVID-19 vaccination is very low and that the benefits of vaccination outweigh any potential risks or side effects.

Ethics Statement

Informed consent was obtained from the patient.

Availability of Data and Material

Data sharing not applicable to this article as no datasets were generated or analyzed during the study.

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Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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