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COVID-19

A case of anti-MOG antibody-positive ADEM following COVID-19 mRNA vaccination

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Dear Editor,

Recently, an anti-myelin oligodendrocyte glycoprotein (MOG) antibody-positive acute disseminated encephalomyelitis (ADEM) caused by ChAdOx1 nCoV-19 vaccine (Oxford-AstraZeneca) was reported in *Neurological Sciences* [1]. Although this is rare, we report a severe case of ADEM anti-MOG antibody positive with BNT162b2 CoV-19 mRNA vaccine (Pfizer).

A 54-year-old female office worker had fever and headache from the 12th day after receiving her second BNT162b2 CoV-19 mRNA vaccine (Pfizer), tended to lie down from the 14th day, and was admitted to the emergency room. Her body temperature was 39.3 °C, she had a tendency to somnolence, and urinary retention appeared. Blood tests showed a mild inflammatory reaction (WBC 8130/μL, CRP 1.17 mg/dL), urinalysis was normal, and computed tomography images of the chest and abdomen showed no abnormal findings. Cerebrospinal fluid (CSF) showed elevated protein levels (31.2 mg/mL) and increased cell count (23/μL, 91% mononuclear cells), and head magnetic resonance imaging showed lesions in the bilateral basal ganglia, midbrain, and cerebral white matter (Fig. 1). She was diagnosed with post-vaccination ADEM, and steroid pulse therapy (mPSL; methylprednisolone 1000 mg/day for 3 days) was initiated.

Examination was limited due to a decreased level of consciousness, but bilateral ocular abduction palsy and facial paralysis were suspected. There were no involuntary movements, and reflexes were normal. Additional CSF tests revealed elevated myelin basic protein (809.8 pg/mL), but normal angiotensin-converting enzyme and interleukin-2 receptor levels. Blood tests were negative for anti-aquaporine-4 antibody and other encephalitis-related auto-antibodies (glutamate receptors, leucine-rich glioma-inactivated protein 1, contactin-associated protein 2, and glial fibrillary acidic protein).

Because the level of consciousness did not sufficiently improve, after three courses of steroid pulses, seven plasma exchanges (PE) were conducted upon which the level of consciousness improved, and the patient was able to speak in single sentences. At this point, bilateral abducens nerve palsy, facial paralysis, sluggish movement, and muscle stiffness became apparent, and intravenous immunoglobulin therapy (IVIg; 400 mg/kg/day for 5 days) was administered. As a result, she was able to walk unsteadily but unaided and was transferred to a rehabilitation hospital on the 57th day after her hospitalization. At this point, blood tests revealed anti-MOG antibody positivity. Three months after her discharge from our hospital, she had recovered well without relapse. She was able to perform activities of daily living independently.

Cases of ADEM after COVID-19 vaccination have been reported, although they are considered rare [2–4]. Many cases of encephalitis following COVID-19 vaccination have a history of immune-mediated disease, and most have a good outcome [5].

Mumoli's case was mainly spinal cord lesion and was relieved by mPSL, while our case was mainly cerebral lesion and required PE and IVIg in addition to mPSL. Both cases had sequelae: urinary retention in Mumoli's case and higher brain dysfunction in our case. More similar cases need to be analyzed to study and prevent the disease.

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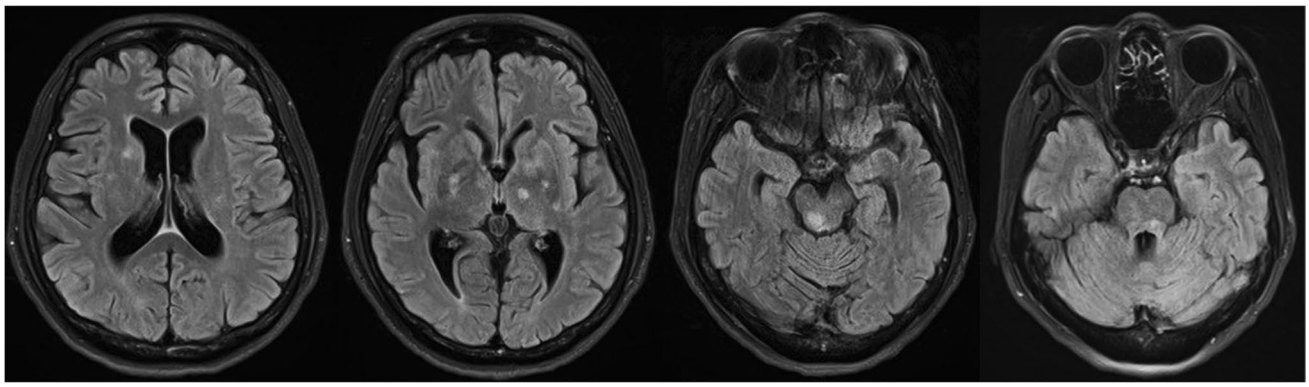

Fig. 1 Brain magnetic resonance images on admission. Plain fluid-attenuated inversion recovery (FLAIR) images showed high signal areas in the bilateral basal ganglia, midbrain, and cerebral white matter

Declarations

Ethical approval None.

Conflict of interest Speaker honoraria (K. Miyamoto): Alexion and Chugai Pharmaceutical.

References

1. Mumoli L, Vescio V, Pirritano D et al (2022) ADEM anti-MOG antibody-positive after SARS-CoV2 vaccination. Neurol Sci 43:763–766
2. Kania K, Ambrosius W, Tokarz Kupczyk E et al (2021) Acute disseminated encephalomyelitis in a patient vaccinated against SARS-CoV-2. Ann Clin Transl Neurol 8:2000–2003
3. Vogrig A, Janes F, Gigli GL et al (2021) Acute disseminated encephalomyelitis after SARS-CoV-2 vaccination. Clin Neurol Neurosurg 208:106839
4. Zuhorn F, Graf T, Klingebiel R et al (2021) Postvaccinal encephalitis after ChAdOx1 nCov-19. Ann Neurol 90:506–511
5. Ismail II, Salama S (2022) A systematic review of cases of CNS demyelination following COVID-19 vaccination. J Neuroimmunol 362:577765