Overlapping syndrome mimicking infectious meningoencephalitis in a patient with MOG and GFAP IgG

Su-qiong Ji

Tongji Hospital of Tongji Medical College of Huazhong University of Science and Technology

Chen-chen Liu

Tongji Hospital of Tongji Medical College of Huazhong University of Science and Technology

Bi-tao Bu (✉ bubitaoyeah.net)

Tongji Hospital of Tongji Medical College of Huazhong University of Science and Technology

Case report

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Abstract

Background

The presence of CNS overlapping autoimmune syndrome is not uncommon, but only one case of overlapping syndrome with coexistence of MOG-IgG and GFAP-IgG had been reported. This is the first reported case of these double antibodies positive presenting as clinical meningoencephalitis.

Case presentation:

A 23-year-old woman presented with transient convulsions, loss of consciousness, persistent fever, headache and vomiting. The cerebrospinal fluid (CSF) analysis revealed elevated cellularity, Magnetic resonance imaging (MRI) showed diffuse leptomeningeal enhancement. She remained fever and headache with antiviral and antibiotic treatment for two weeks, then was treated with empirical anti-tuberculosis treatment and oral prednisolone therapy. She followed up at 3 months from presentation with symptoms improved and normal CSF analysis. 3-month follow-up MRI performed asymmetric lesions in the cerebellum, corona radiata, and white matter with enhancement. Anti-tuberculosis treatment was continued and steroid was discontinued. After She stopped taking the prednisolone, interrupted headache gradually appeared. MRI at 4 months after presentation revealed partial reduced extent of lesions, but enlarged areas in left cerebellum and right parietal white matter, as well as a new lesion in the region of the right ependyma with linearly enhancement. Screening for anti-myelin oligodendrocyte glycoprotein (MOG) antibody and anti-glial fibrillary acidic protein (GFAP) antibody were positive in CSF by transfected cell-based assay. She was diagnosed with overlapping syndrome of MOG-IgG-associated disease and GFAP astrocytopathy and received steroid pulse therapy (methylprednisolone 1 g for 5 days) followed by a gradual tapering of oral prednisolone, as well as addition of immunosuppressant (tacrolimus, 3 mg per day). 6 months after the patient's initial presentation, no symptom was found, MRI showed the lesions had obviously diminished and no enhancement was found.

Conclusions

To our knowledge, this is the first reported case of overlapping syndrome with coexistence of MOG-IgG and GFAP-IgG presenting as clinical meningoencephalitis. The early screening of autoantibodies against CNS antigens was of great importance for the patient suspected of intracranial infection to make the definite diagnosis.

Background

Autoimmune glial fibrillary acidic protein (GFAP) astrocytopathy is an inflammatory central nervous system (CNS) disorder with GFAP-IgG in serum or CSF as the specific biomarker ¹. Common symptoms and signs of autoimmune glial fibrillary acidic protein (GFAP) astrocytopathy are encephalitic and

papillitis without increased intracranial pressure, and myelopathic², characteristic linear, radial perivascular pattern of enhancement, through the cerebral white matter, emanating from GFAP-enriched peri-lateral ventricular region, CSF demonstrates marked inflammatory changes in almost all patients. 90% have a lymphocyte-predominant elevation in white blood cells (average 80/ml), 80% have elevated protein, and half have CSF-exclusive oligoclonal bands¹. Anti-MOG antibody-associated encephalitis may include ADEM, brainstem encephalitis, and cerebral cortical encephalitis, and it may also affect the subcortical white matter³.

The case presented here were diagnosed with anti-MOG anti-body-associated and autoimmune glial fibrillary acidic protein (GFAP) astrocytopathy involving cerebrum and meninges.

Case Presentation

A 23-year-old woman presented with transient convulsions and loss of consciousness. She reported a 15-day history of persistent fever, headache, and vomiting. On admission, neurologic examination was unremarkable except for a positive kernig sign. The cerebrospinal fluid (CSF) analysis revealed elevated cellularity (white blood cell count of 210/ μ L, being 60% lymphocytes, 25% neutrophils, and 14% monocytes), protein level of 537 mg/L, normal glucose level and cultures for bacteria, tuberculosis and fungi. Magnetic resonance imaging (MRI) showed no obvious abnormality in brain parenchyma, but diffuse leptomeningeal enhancement (Fig. 1A and 2A). Screening for common anti-neuronal and anti-neuropil antibodies was negative (GAD65, NMDAR, GABABR, IgLON5, AMPAR2, DPPX, LGI1, CASPR2). She remained fever and headache with antiviral and antibiotic treatment for two weeks. Repeat CSF tests still showed leukocytosis (165/ μ L) and slightly elevated protein level (554 mg/L). Although without a laboratory confirmed diagnosis of tuberculous meningoencephalitis, she was treated with empirical anti-tuberculosis treatment and oral prednisolone therapy. Two weeks later, fever was improved but headache was remained. The white blood cell count in the CSF decreased to 80/ μ L and the CSF protein level returned to normal.

She followed up at 3 months from presentation with symptoms improved and normal CSF analysis. However, follow-up MRI performed asymmetric lesions in the cerebellum, corona radiata, and white matter with enhancement (Fig. 1B and 2B). Then, anti-tuberculosis treatment was continued and steroid was discontinued. After She stopped taking the prednisolone, interrupted headache gradually appeared. Results of a third MRI at 4 months after presentation revealed partial reduced extent of lesions, but enlarged areas in left cerebellum and right parietal white matter, as well as a new lesion in the region of the right ependyma with linearly enhancement (Fig. 1C and 2C). Owing to the poor efficacy of anti-infective treatment and characteristically changes on neuroimaging, such as radial enhancement patterns extending outward from the ventricles on enhanced MRI,¹ central nervous system autoimmune disease was listed as a possible diagnosis. Screening for anti-myelin oligodendrocyte glycoprotein (MOG) antibody and anti-glial fibrillary acidic protein (GFAP) antibody were positive in CSF by transfected cell-based assay. Spinal and optic nerve MRI revealed no abnormal findings. She was diagnosed with overlapping syndrome of MOG-IgG-associated disease and GFAP astrocytopathy and received steroid

pulse therapy (methylprednisolone 1 g for 5 days) followed by a gradual tapering of oral prednisolone, as well as addition of immunosuppressant (tacrolimus, 3 mg per day). 6 months after the patient's initial presentation, no symptom was found, MRI showed the lesions had obviously diminished and no enhancement was found (Fig. 1D and 2D).

Discussion And Conclusions

The presence of CNS overlapping autoimmune syndrome is not uncommon,⁴ but only one case of overlapping syndrome with coexistence of MOG-IgG and GFAP-IgG had been reported.⁵ To our knowledge, this is the first reported case of these double antibodies positive presenting as clinical meningoencephalitis. The early screening of autoantibodies against CNS antigens was of great importance for the patient suspected of intracranial infection to make the definite diagnosis. Although the underlying mechanisms for coexistence of MOG-IgG and GFAP-IgG still remains elusive, steroid treatment and long-term immunosuppression may be reasonable.⁶

Abbreviations

myelin oligodendrocyte glycoprotein -IgG

MOG-IgG

glial fibrillary acidic protein-IgG

GFAP-IgG

Declarations

Ethics approval and consent to participate

Ethical approval was obtained by the ethical committee of Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology.

Consent to publication

Written informed consent for publication was obtained from all authors and participants.

Availability of data and materials

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

Conflict of Interest Disclosures: None reported

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Author Contributions:

- Dr Bu had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.
- *Concept and design*: All authors.
- *Analysis and interpretation of data*: Dr Ji and Liu.
- *Revised the manuscript*: All authors.
- All authors approved the final version of the manuscript.

Competing interests The authors have no conflict of interests.

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Figures

Figure 1

Serial Magnetic Resonance Imaging Scans. A. Axial brain fluid-attenuated inversion recovery imaging revealing no obvious abnormality in brain parenchyma. B. Repeated MRI after 3 months showing asymmetric hyperintense signal change of the cerebellum, corona radiata, frontal and parietal white matter. C. MRI at 4 months from presentation showing partial reduced extent of lesions, but enlarged areas in left cerebellum and right parietal white matter, as well as a new lesion in the region of the right ependyma. D. MRI at 6 months from presentation revealing obviously resolution of abnormalities.

Figure 2

Serial Postcontrast Magnetic Resonance Imaging Coronal Scans. A. Coronal contrast-enhanced MRI revealing diffuse leptomeningeal enhancement. B. Repeated MRI after 3 months showing enhanced lesions in the cerebellum, corona radiata, frontal and parietal white matter. C. MRI at 4 months from presentation showing linearly vessel enhancement in the region of the ependyma. D. No enhancement was found on enhanced-MRI at 6 months from presentation.