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Case Report

Anti-MOG antibody encephalitis mimicking neurological deterioration in a case of Rett syndrome with *MECP2* mutation

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Abstract

Background: Rett syndrome (RTT) is a neurodevelopmental disorder primarily caused by mutations in the methyl-CpG-binding protein 2 (MECP2) gene, resulting in developmental regression after normal development during infancy. Transient presentation of many autistic features is also commonly seen in RTT. Anti-myelin oligodendrocyte glycoprotein (MOG)-antibody encephalitis is an acquired relapsing demyelinating syndrome characterized by a variety of neuroinflammatory symptoms. Here, we report a case of anti-MOG antibody encephalitis in a patient with genetically confirmed RTT, which mimicked many of the features of RTT.

Case report: A three-year-old girl presented with subacute verbal and motor dysfunction, along with involuntary movements and marked irritability. Magnetic resonance imaging (MRI) revealed extensive white matter lesions, with anti-MOG antibodies detected in the serum and cerebrospinal fluid, resulting in an initial diagnosis of anti-MOG antibody encephalitis. However, additional testing of the MECP2 gene was performed in response to persistent involuntary hand movements in combination with progressive verbal and motor deterioration. Sequencing analysis revealed a known pathogenic mutation in MEPC2, indicating a concurrent diagnosis of RTT.

Conclusion: Both RTT and anti-MOG antibody encephalitis are rare conditions. Similarities in disease presentation suggest that anti-MOG antibody encephalitis may mimic many of the symptoms of RTT.

Keywords: Anti-MOG antibody encephalitis; Rett syndrome; *MECP2*; Mutation; MRI

1. Introduction

Rett syndrome (RTT) is a neurodevelopmental disorder almost exclusively seen in females, characterized by profound cognitive impairment, poor communication skills, and stereotypic hand movements. Patients typically present with neurological regression beginning

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between 6 and 18 months of age after a period of apparently normal development, including acquisition of fine motor skills and language. During the regression period, fine motor skills, effective eye contact, and communication are lost. Features of autism, including limited eye contact, poor socialization, and interaction with irritability, often occur during this period. Typically, autistic features are transient, lasting from weeks to many months [1]. Disease etiology is strongly linked to mutations in methyl-CpG-binding protein 2 (MECP2), which is considered the primary cause of RTT [2].

Despite significant heterogeneity in clinical presentation, growing evidence supports a diagnosis of myelin oligodendrocyte glycoprotein (MOG) antibody-associated disease in children with relapsing acquired demyelinating syndromes whose sera test positive for anti-MOG antibodies [3]. Recent reports of anti-MOG antibody-associated diseases in children include cases of subacute onset encephalopathy with ataxia and motor regression, and encephalopathy with irritability [3].

Here, we report a case of anti-MOG antibody encephalitis in a patient with genetically confirmed RTT. This is an unusual case in that symptoms caused by anti-MOG antibody encephalitis mimicked features of RTT. Convergence of these two diseases may lead to a better understanding of autoimmunity in RTT. This case also highlights the need to consider the possibility of multiple rare conditions during clinical diagnosis.

2. Case report

A three-year-old girl was transferred to our hospital with symptoms of subacute verbal and motor dysfunction, along with involuntary movement and marked irritability. The patient was the first child of nonconsanguineous parents. No family history of neurological or metabolic disorders was reported. The mother's pregnancy and delivery were uncomplicated. Her early developmental milestones were not obviously delayed (single-word speech at 12 months and two-word sentences at 24 months; standing alone at 12 months and walking without support at 13 months), and no specific involuntary movements had been observed during infancy.

Initial signs of motor dysfunction first appeared after *Streptococcus pyogenes* and influenza infection one year prior to admission, although symptoms gradually improved without treatment. However, a decline in verbal expression and an increase in autism-like behaviors began two weeks prior to admission. Before being transferred to our facility, the patient had been admitted to another hospital due to motor dysfunction and marked irritability with repetitive hand-wringing after a febrile episode. Initial magnetic resonance imaging (MRI) revealed extensive white matter lesions in the brain (Fig. 1), which were further investigated upon transfer to our hospital. At the time of admission, cerebrospinal fluid (CSF) analyses revealed white blood cell count of 138 cells/μL (neutrophils 64, monocytes 74), protein

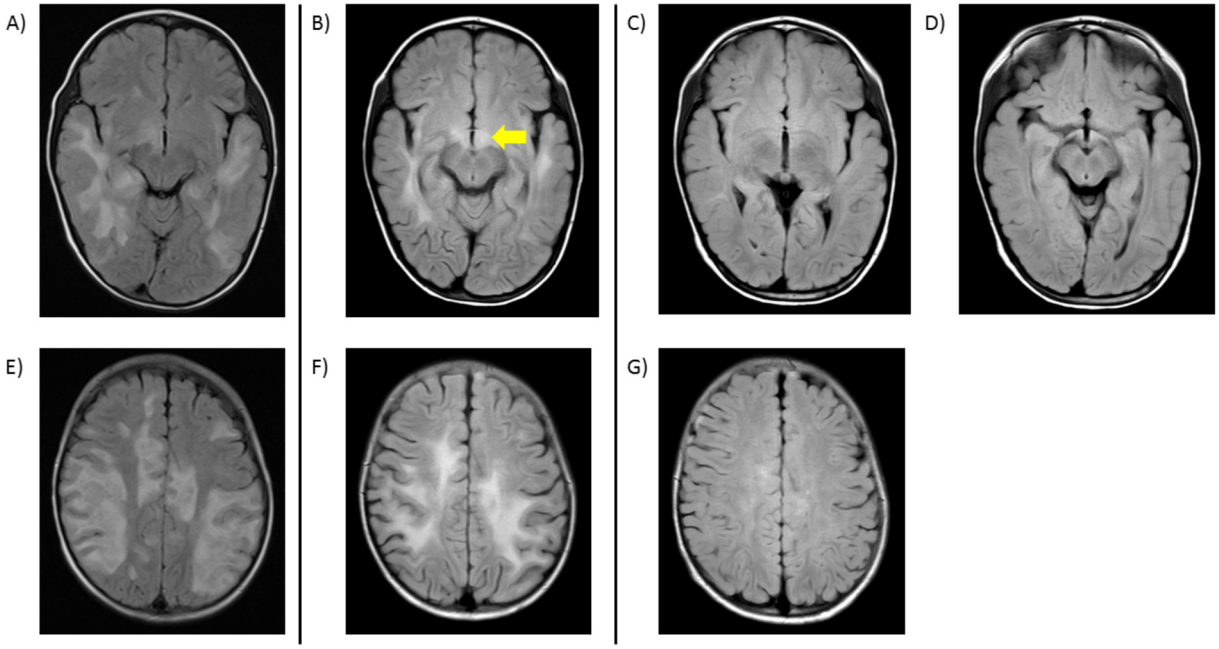

Fig. 1. MRI findings (axial FLAIR imaging). (A and E) Evidence of extensive white matter lesions at the time of admission. (B and F) Decreases in initial lesion size concomitant with the occurrence of a novel lesion (arrow) 14 days after the first MRI. (C, D, and G) Follow-up studies revealed marked resolution of lesions 9 months after the first MRI.

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