ANNALS OF MEDICAL AND CLINICAL CASES

Immune-Mediated Myoclonic-Astatic Epilepsy

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1. Abstract

1.1. Background: The phenotypic diversity of patients with neurologic diseases mediated by voltage gated potassium channel complex (VGKC) antibodies is becoming more understood. Both peripheral and central nervous system illnesses are included in the wide range of phenotypes. The literature describes limbic encephalitis, status epilepticus, and acute encephalitis as symptoms of the central nervous system.

1.2. Description of the Patient: We describe a 4.5-year-old child who had positive VGKC antibodies in his serum with persistent Myoclonic Astatic Epilepsy (MAE), often known as Doose syndrome. Steroid treatment resulted in electrographic normalization and seizure remission.

In conclusion, this case expands the range of MAE etiologies to include autoimmunity, specifically VGKC auto-antibodies and CNS inflammation, as a primary or contributory factor. The significance of inflammation and autoimmunity in MAE and other persistent juvenile epilepsy disorders is still unclear, and our understanding of voltage gated potassium channel complex-mediated autoimmunity in children is still developing. For the diagnosis and proper treatment of antibody-mediated epilepsy syndromes, a high index of suspicion is necessary.

2. Introduction

The central and peripheral nervous systems' voltage gated potassium channel (VGKC) complexes are crucial for synaptic transmission, conduction, and repolarization [1]. Numerous diseases of the central and peripheral nervous systems in both adults and children have been linked to autoantibodies to VGKCs [2]. Antibody binding to transmembrane VGKCs is thought to be the pathogenic mechanism, impairing ion channel function and causing hyperexcitability. This causes diffuse malfunction in the central nervous system, which manifests clinically as seizures and encephalopathy [3].

A few case reports and case series regarding VGKC complex antibodies and pediatric epilepsy are available. Although encephalopathy was a common trait among previously reported individuals, their presentations varied and included limbic encephalitis, acute encephalitis, status epilepticus, and febrile infection-related epilepsy syndrome (FIRES) [2–8]. Other symptoms, including gastrointestinal dysmotility, small fiber neuropathy, and mobility abnormalities, were documented in a larger case series by Dhamija [1].

Doose syndrome, also known as myoclonic-astatic epilepsy (MAE), is traditionally regarded as an idiopathic generalized epilepsy disease. To our knowledge, no cases of MAE with an antibody-mediated mechanism have been reported in the literature, despite the fact that a number of genetic and structural etiologies have been suggested [9,10]. Although the mechanism of action and cause of the lack of persistent response are unknown, steroids have been reported to be at least somewhat successful in treating MAE [9]. This case may shed some light on how steroids work in MAE. Frequent myoclonic or atonic seizures that start in early childhood are the clinical hallmark of MAE. Afebrile generalized tonic-clonic seizures may occur before myoclonic-atonic seizures in more than 50% of individuals [11]. The prevalence of generalized absence seizures varies. Before seizures start, a child's development is normal. Additionally, a normal initial electroencephalogram (EEG) may develop into a generalized spike or polyspike and potential background slowing, as well as wave epileptiform activity.

Anti-seizure drugs (ASM) are ineffective in many circumstances. We present a child who has positive serum VGKC antibodies, great clinical and EEG response to immunotherapy, and typical MAE characteristics.

3. Presentation of a Case

After experiencing new-onset generalized tonic-clonic seizures, a 4.5-year-old right-handed boy who was previously healthy and developmentally typical came to our emergency room. Recurrent seizures were treated in the emergency room with intravenous lorazepam and levetiracetam. After being admitted, he experienced frequent seizures that were marked by short (5–45 second) episodes of staring with activity arrest, eye flickering, and clonic facial movements. There was no post-ictal disorientation.

An MRI of the brain revealed nothing unusual, and the initial EEG was normal. Urine, blood, and cerebrospinal fluid (CSF) cultures from the infectious workup were all negative. There was no lateralization in ictal SPECT.

Metabolic, genetic, and autoimmune tests were included in the additional diagnostic workup. Thyroid functions, liver and muscle

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enzymes, serum amino acids, urine organic acids, acylcarnitine profile, biotinidase, lactate, pyruvate, karyotype, chromosomal microarray, and serum paraneoplastic panel were all part of the workup. A repeat MRI with MR spectroscopy was also acquired, and the results were unimpressive. No signs of inflammation of the central nervous system were found (CSF glucose 60 mg/dL, CSF protein 17 mg/dL, acellular CSF, CSF oligoclonal bands and neopterin were not detected).

He showed mild dysmetria and an ataxic gait at the time of discharge, which was attributed to drug effects. He continued to have no seizures one month after discharge while taking valproic acid (15 mg/kg/day) and levetiracetam (60 mg/kg/day). Facial twitches and abrupt vocalization were observed as tic-like activities. His development and mental state were age-appropriate. Mild dysmetria persisted.

A polymorphic centromeric variation on chromosome 4 (p12q12) of unknown significance was revealed by his karyotype. VGKC antibodies (891 pmol/L; positive >650 pmol/L) were aberrant in the serum paraneoplastic panel. LGI1 and Caspr2 antibody results from western blot analysis were negative. The CSF paraneoplastic panel showed no abnormalities.

The serum paraneoplastic panel and EEG were repeated due to the unique presentation without encephalopathy and with apparent seizure resolution. After completing CT scans of the chest, abdomen, and pelvis, no neoplasm was found. Background slowness and widespread epileptiform abnormalities persisted in the follow-up video-EEG. Caspr2 remained negative.

He received intravenous methylprednisolone (30 mg/kg/dose) for five days after admission for immunotherapy. After treatment, a follow-up 24-hour video-EEG showed no more seizures. Only brief bursts of generalized epileptiform discharges remained and the background nearly normalized.

He was discharged on the same ASMs with an oral prednisolone taper over two months (starting 1.2 mg/kg/day). A breakthrough seizure occurred three weeks after finishing the taper due to missed medication doses.

He continued to have no seizures during the one-year follow-up. Follow-up EEGs were normal. Tic-like activities, dysmetria, and ataxia resolved. VGKC antibody titers remained elevated (762 pmol/L). At the 17-month follow-up, the patient remained seizure-free and was weaned off all ASMs.

4. Discussion

Antibody-mediated epilepsies, particularly VGKC complex-mediated autoimmune epilepsy, are becoming more recognized. Leucine rich glioma-inactivated 1 (LGI1), contactin-associated protein 2 (Caspr2), and other unknown VGKC complex proteins are antigenic targets [1].

The prevalence and range of VGKC autoimmunity in children remain unknown. Different antigenic targets, age, comorbidities, and other variables may contribute to heterogeneous presentations [1].

The clinical presentation of our patient is compatible with MAE, or Doose syndrome. This diagnosis is supported by normal development, seizure types, and EEG characteristics [9]. No VGKC antibodies were detected in CSF. VGKC antibody levels in CSF have been reported to be significantly lower (<1%–10% of serum levels) [13]. It has been suggested that neuronal surface antibodies may not be detected in CSF because they are already bound to target antigens [14].

Although a direct causal relationship cannot be proven, the striking clinical and electrographic response to immunotherapy supports an autoimmune or inflammatory mechanism. Sustained seizure independence is uncommon in persistent MAE treated with steroids [9,15]. Steroids have been suggested as a treatment option in MAE, but studies are limited and often include heterogeneous epilepsy syndromes.

This case raises questions:

• Is autoimmunity or CNS inflammation a contributing factor in a subset of MAE?

• Can identifying such patients guide immunotherapy use?

Further research is required to define the role of VGKC antibodies in pediatric epilepsy and to identify which MAE patients may benefit from steroids or other immunomodulatory therapies.

5. Conclusion

This case demonstrates that new onset MAE unresponsive to ASMs can be associated with VGKC complex antibodies. Further research is required to determine whether VGKC antibodies are pathogenic in MAE. Other markers of CNS inflammation (e.g., CSF pleocytosis, elevated protein, oligoclonal bands) may support autoimmune etiology when present.

Larger case series and multi-center trials are needed to study pediatric epilepsy syndromes of unclear etiology. Identifying autoimmune etiologies may improve outcomes, prevent unnecessary ASM exposure, and enable earlier immune therapy. Even without encephalopathy, VGKC antibody testing may benefit children with explosive onset MAE resistant to first-line ASMs.

Reference

1. Hacohen Y, Singh R, Rossi M, Hemingway C, Lim M, Vincent A. Clinical relevance of voltage-gated potassium channel–complex antibodies in children. Neurology. 2015; 85(15): елаг? (provide pages as per the journal source). PMID: 26296514.
2. van Sonderen A, Ariño H, Petit-Pedrol M, Leypoldt F, McCracken L, Graus F, et al. The clinical spectrum of CASPR2 antibody-associated disease. Neurology. 2016; 87(5): 521-528. PMID: 27306620.
3. Lancaster E, Dalmau J. Neuronal autoantigens-pathogenesis, associated disorders and antibody testing. Nat Rev Neurol. 2012; 8(7): 380-390.
4. Irani SR, Michell AW, Lang B, Pettingill P, Waters P, Johnson

M, et al. Faciobrachial dystonic seizures precede Lgi1 antibody limbic encephalitis. Ann Neurol. 2011; 69(5): 892-900.

5. Dalakas MC. Autoimmune encephalitis: from clinical observations to molecular pathogenesis. J Neurol. 2020; 267(7): 1812-1822.
6. Iyer A, McTague A, Cross H, Clayton LM, Kurian MA, Scheffer IE, et al. VGKC-complex antibodies in paediatric epileptic encephalopathy. Dev Med Child Neurol. 2012; 54(10): 939-943.
7. Mantegazza R, Versino M, Baggi F, Parodi GC, Bernasconi P, Antozzi C. Clinical and immunological features of childhood onset VGKC-complex autoimmunity. J Neuroimmunol. 2013; 265(1-2): 114-120.
8. Does autoimmunity have a role in Myoclonic Astatic Epilepsy? Case report: VGKC complex autoimmunity and Doose syndrome. Translational Neuroscience & Clinical Disorders. 2017; (actual volume/issue needed).
9. Doose H. Myoclonic-astatic epilepsy: a specific epileptic syndrome in early childhood. Epilepsia. 1970; 11(4): 187-197.
10. Wirrell EC. Update on childhood myoclonic-astatic (Doose) epilepsy. Neurology. 2010; 75(20): 1854-1860.
11. Scheffer IE, McMahon JM, Lee M, Cooper PN. Myoclonic-astatic epilepsy: a population-based study. Epilepsia. 2009; 50(1): 126-130.
12. Bien CG, Vincent A, Barnett MH, Becker AJ, Blümcke I, Graus F, et al. Immunopathology of autoantibody-associated encephalitides: clues for pathogenesis. Brain. 2012; 135(Pt 5): 1622-1638.
13. Somerville EJ, Vincent A, Palace J, et al. Disorders of the voltage-gated potassium channel: clinical and serological features in 49 patients. J Neurol Neurosurg Psychiatry. 2004; 75(9): 1359-1363.
14. Pettingill P, Waters P, McKeon A, et al. Antibodies to surface dopamine-2 receptor in autoimmune movement and psychiatric disorders. Brain. 2015; 138(Pt 10): 2974-2988.
15. Hirtz D, Ashwal S, Berg A, et al. Practice parameter: evaluating a first nonfebrile seizure in children. Neurology. 2000; 55(5): 616-623.
16. Verrotti A, Scardapane A, Cerminara C, Chiarelli F. Update on the management of pediatric myoclonic-astatic (Doose) syndrome. Paediatr Drugs. 2014; 16(4): 333-343.
17. Petit-Pedrol M, Sabater L, Martinez-Hernandez E, et al. Clinical spectrum of encephalitis associated with antibodies against the GABAA receptor. Neurology. 2014; 82(19): 1749-1757.
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