

World Journal of *Clinical Cases*

World J Clin Cases 2022 June 26; 10(18): 5934-6340



MINIREVIEWS

- 5934** Development of clustered regularly interspaced short palindromic repeats/CRISPR-associated technology for potential clinical applications
Huang YY, Zhang XY, Zhu P, Ji L
- 5946** Strategies and challenges in treatment of varicose veins and venous insufficiency
Gao RD, Qian SY, Wang HH, Liu YS, Ren SY
- 5957** Diabetes mellitus susceptibility with varied diseased phenotypes and its comparison with phenome interactome networks
Rout M, Kour B, Vuree S, Lulu SS, Medicherla KM, Suravajhala P

ORIGINAL ARTICLE**Clinical and Translational Research**

- 5965** Identification of potential key molecules and signaling pathways for psoriasis based on weighted gene co-expression network analysis
Shu X, Chen XX, Kang XD, Ran M, Wang YL, Zhao ZK, Li CX
- 5984** Construction and validation of a novel prediction system for detection of overall survival in lung cancer patients
Zhong C, Liang Y, Wang Q, Tan HW, Liang Y

Case Control Study

- 6001** Effectiveness and postoperative rehabilitation of one-stage combined anterior-posterior surgery for severe thoracolumbar fractures with spinal cord injury
Zhang B, Wang JC, Jiang YZ, Song QP, An Y

Retrospective Study

- 6009** Prostate sclerosing adenopathy: A clinicopathological and immunohistochemical study of twelve patients
Feng RL, Tao YP, Tan ZY, Fu S, Wang HF
- 6021** Value of magnetic resonance diffusion combined with perfusion imaging techniques for diagnosing potentially malignant breast lesions
Zhang H, Zhang XY, Wang Y
- 6032** Scar-centered dilation in the treatment of large keloids
Wu M, Gu JY, Duan R, Wei BX, Xie F
- 6039** Application of a novel computer-assisted surgery system in percutaneous nephrolithotomy: A controlled study
Qin F, Sun YF, Wang XN, Li B, Zhang ZL, Zhang MX, Xie F, Liu SH, Wang ZJ, Cao YC, Jiao W

- 6050** Influences of etiology and endoscopic appearance on the long-term outcomes of gastric antral vascular ectasia

Kwon HJ, Lee SH, Cho JH

Randomized Controlled Trial

- 6060** Evaluation of the clinical efficacy and safety of TST33 mega hemorrhoidectomy for severe prolapsed hemorrhoids

Tao L, Wei J, Ding XF, Ji LJ

- 6069** Sequential chemotherapy and icotinib as first-line treatment for advanced epidermal growth factor receptor-mutated non-small cell lung cancer

Sun SJ, Han JD, Liu W, Wu ZY, Zhao X, Yan X, Jiao SC, Fang J

Randomized Clinical Trial

- 6082** Impact of preoperative carbohydrate loading on gastric volume in patients with type 2 diabetes

Lin XQ, Chen YR, Chen X, Cai YP, Lin JX, Xu DM, Zheng XC

META-ANALYSIS

- 6091** Efficacy and safety of adalimumab in comparison to infliximab for Crohn's disease: A systematic review and meta-analysis

Yang HH, Huang Y, Zhou XC, Wang RN

CASE REPORT

- 6105** Successful treatment of acute relapse of chronic eosinophilic pneumonia with benralizumab and without corticosteroids: A case report

Izhakian S, Pertzov B, Rosengarten D, Kramer MR

- 6110** Pembrolizumab-induced Stevens-Johnson syndrome in advanced squamous cell carcinoma of the lung: A case report and review of literature

Wu JY, Kang K, Yi J, Yang B

- 6119** Hepatic epithelioid hemangioendothelioma after thirteen years' follow-up: A case report and review of literature

Mo WF, Tong YL

- 6128** Effectiveness and safety of ultrasound-guided intramuscular lauromacrogol injection combined with hysteroscopy in cervical pregnancy treatment: A case report

Ye JP, Gao Y, Lu LW, Ye YJ

- 6136** Carcinoma located in a right-sided sigmoid colon: A case report

Lyu LJ, Yao WW

- 6141** Subcutaneous infection caused by *Mycobacterium abscessus* following cosmetic injections of botulinum toxin: A case report

Deng L, Luo YZ, Liu F, Yu XH

- 6148** Overlapping syndrome of recurrent anti-N-methyl-D-aspartate receptor encephalitis and anti-myelin oligodendrocyte glycoprotein demyelinating diseases: A case report
Yin XJ, Zhang LF, Bao LH, Feng ZC, Chen JH, Li BX, Zhang J
- 6156** Liver transplantation for late-onset ornithine transcarbamylase deficiency: A case report
Fu XH, Hu YH, Liao JX, Chen L, Hu ZQ, Wen JL, Chen SL
- 6163** Disseminated strongyloidiasis in a patient with rheumatoid arthritis: A case report
Zheng JH, Xue LY
- 6168** CYP27A1 mutation in a case of cerebrotendinous xanthomatosis: A case report
Li ZR, Zhou YL, Jin Q, Xie YY, Meng HM
- 6175** Postoperative multiple metastasis of clear cell sarcoma-like tumor of the gastrointestinal tract in adolescent: A case report
Huang WP, Li LM, Gao JB
- 6184** Toripalimab combined with targeted therapy and chemotherapy achieves pathologic complete response in gastric carcinoma: A case report
Liu R, Wang X, Ji Z, Deng T, Li HL, Zhang YH, Yang YC, Ge SH, Zhang L, Bai M, Ning T, Ba Y
- 6192** Presentation of Boerhaave's syndrome as an upper-esophageal perforation associated with a right-sided pleural effusion: A case report
Tan N, Luo YH, Li GC, Chen YL, Tan W, Xiang YH, Ge L, Yao D, Zhang MH
- 6198** Camrelizumab-induced anaphylactic shock in an esophageal squamous cell carcinoma patient: A case report and review of literature
Liu K, Bao JF, Wang T, Yang H, Xu BP
- 6205** Nontraumatic convexal subarachnoid hemorrhage: A case report
Chen HL, Li B, Chen C, Fan XX, Ma WB
- 6211** Growth hormone ameliorates hepatopulmonary syndrome and nonalcoholic steatohepatitis secondary to hypopituitarism in a child: A case report
Zhang XY, Yuan K, Fang YL, Wang CL
- 6218** Vancomycin dosing in an obese patient with acute renal failure: A case report and review of literature
Xu KY, Li D, Hu ZJ, Zhao CC, Bai J, Du WL
- 6227** Insulinoma after sleeve gastrectomy: A case report
Lobaton-Ginsberg M, Sotelo-González P, Ramirez-Renteria C, Juárez-Aguilar FG, Ferreira-Hermosillo A
- 6234** Primary intestinal lymphangiectasia presenting as limb convulsions: A case report
Cao Y, Feng XH, Ni HX
- 6241** Esophagogastric junctional neuroendocrine tumor with adenocarcinoma: A case report
Kong ZZ, Zhang L

- 6247** Foreign body granuloma in the tongue differentiated from tongue cancer: A case report
Jiang ZH, Xu R, Xia L
- 6254** Modified endoscopic ultrasound-guided selective N-butyl-2-cyanoacrylate injections for gastric variceal hemorrhage in left-sided portal hypertension: A case report
Yang J, Zeng Y, Zhang JW
- 6261** Management of type IIb dens invaginatus using a combination of root canal treatment, intentional replantation, and surgical therapy: A case report
Zhang J, Li N, Li WL, Zheng XY, Li S
- 6269** Clivus-involved immunoglobulin G4 related hypertrophic pachymeningitis mimicking meningioma: A case report
Yu Y, Lv L, Yin SL, Chen C, Jiang S, Zhou PZ
- 6277** De novo brain arteriovenous malformation formation and development: A case report
Huang H, Wang X, Guo AN, Li W, Duan RH, Fang JH, Yin B, Li DD
- 6283** Coinfection of *Streptococcus suis* and *Nocardia asiatica* in the human central nervous system: A case report
Chen YY, Xue XH
- 6289** Dilated left ventricle with multiple outpouchings – a severe congenital ventricular diverticulum or left-dominant arrhythmogenic cardiomyopathy: A case report
Zhang X, Ye RY, Chen XP
- 6298** Spontaneous healing of complicated crown-root fractures in children: Two case reports
Zhou ZL, Gao L, Sun SK, Li HS, Zhang CD, Kou WW, Xu Z, Wu LA
- 6307** Thyroid follicular renal cell carcinoma excluding thyroid metastases: A case report
Wu SC, Li XY, Liao BJ, Xie K, Chen WM
- 6314** Appendiceal bleeding: A case report
Zhou SY, Guo MD, Ye XH
- 6319** Spontaneous healing after conservative treatment of isolated grade IV pancreatic duct disruption caused by trauma: A case report
Mei MZ, Ren YF, Mou YP, Wang YY, Jin WW, Lu C, Zhu QC
- 6325** Pneumonia and seizures due to hypereosinophilic syndrome – organ damage and eosinophilia without synchronisation: A case report
Ishida T, Murayama T, Kobayashi S
- 6333** Creutzfeldt-Jakob disease presenting with bilateral hearing loss: A case report
Na S, Lee SA, Lee JD, Lee ES, Lee TK

LETTER TO THE EDITOR

- 6338** Stem cells as an option for the treatment of COVID-19
Cuevas-González MV, Cuevas-González JC

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Overlapping syndrome of recurrent anti-N-methyl-D-aspartate receptor encephalitis and anti-myelin oligodendrocyte glycoprotein demyelinating diseases: A case report

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Abstract

BACKGROUND

Anti-N-methyl-D-aspartate receptor encephalitis (NMDARe) is capable of presenting a relapsing course and coexisting with myelin oligodendrocyte glycoprotein antibody disease, whereas it has been relatively rare. We describe a man with no history of tumor who successively developed anti-NMDARe and anti-myelin oligodendrocyte glycoprotein antibody disease.

CASE SUMMARY

A 29-year-old man was initially admitted with headache, fever, intermittent abnormal behavior, decreased intelligence, limb twitching and loss of consciousness on July 16, 2018. On admission, examination reported no abnormality. During his presentation, he experienced aggravated symptoms, and the re-examination of cranial magnetic resonance imaging (MRI) indicated punctate abnormal signals in the left parietal lobe. External examination of cerebrospinal fluid and serum results revealed serum NMDAR antibody (Ab) (-), cerebrospinal fluid NMDAR-Ab (+) 1:10 and Epstein-Barr virus capsid antigen antibody IgG (+). Due to the imaging findings, anti-NMDARe was our primary consideration. The patient was treated with methylprednisolone and gamma globulin pulse therapy, mannitol injection dehydration to reduce intracranial pressure, sodium valproate sustained-release tablets for anti-epilepsy and olanzapine and risperidone to mitigate psychiatric symptoms. The patient was admitted to the hospital for the second time for "abnormal mental behavior and increased limb movements" on December 14, 2018. Re-examination of electroencephalography and cranial MRI showed no abnormality. The results of autoimmune encephalitis antibody revealed that serum NMDAR-Ab was weakly positive and cerebrospinal fluid

NMDAR-Ab was positive. Considering comprehensive recurrent anti-NMDARe, the patient was treated with propylene-hormone pulse combined with immunosuppressive agents (mycophenolate mofetil), and the symptoms were relieved. The patient was admitted for “hoarseness and double vision” for the third time on August 23, 2019. Re-examination of cranial MRI showed abnormal signals in the medulla oblongata and right frontal lobe, and synoptophore examination indicated concomitant esotropia. The patient’s visual acuity further decreased, and the re-examination of cranial MRI + enhancement reported multiple scattered speckled and patchy abnormal signals in the medulla oblongata, left pons arm, left cerebellum and right midbrain, thalamus. The patient was diagnosed with an accompanying demyelinating disease. Serum anti-myelin oligodendrocyte glycoprotein 1:10 and NMDAR antibody 1:10 were both positive. The patient was diagnosed with myelin oligodendrocyte glycoprotein antibody-related inflammatory demyelinating disease of the central nervous system complicated with anti-NMDARe overlap syndrome. The patient was successfully treated with methylprednisolone, gamma globulin pulse therapy and rituximab treatment. The patient remained asymptomatic and follow-up MRI scan 6 mo later showed complete removal of the lesion.

CONCLUSION

We emphasize the rarity of this antibody combination and suggest that these patients may require longer follow-up due to the risk of recurrence of two autoimmune disorders.

Key Words: Autoimmune encephalitis; Recurrent anti-N-methyl-D-aspartate receptor encephalitis; Myelin oligodendrocyte glycoprotein; Psoriasis; Case report

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Core Tip: Here we present a man with autoimmune encephalitis in whom antibodies against N-methyl-D-aspartate receptor and myelin oligodendrocyte glycoprotein were sequentially detected. This is the first recurrent N-methyl-D-aspartate receptor encephalitis case in the literature for which antibodies of N-methyl-D-aspartate receptor and myelin oligodendrocyte glycoprotein were positive simultaneously and both supratentorial and infratentorial cranial magnetic resonance imaging were involved. Also, the patient responded very well with the optic nerve injury and encephalitis completely recovering. Psoriasis detected at the 6-mo follow-up may also be an immune-related disease, but the mechanism is unknown.

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INTRODUCTION

In several individuals, anti-N-methyl-D-aspartate receptor encephalitis (anti-NMDARe) may occur with myelin oligodendrocyte glycoprotein (MOG) antibody disease sequentially or simultaneously[1-3]. However, there have been few reports of recurrent anti-NMDARe with MOG antibody disease overlap syndrome worldwide. We present a case of a young man initially admitted with headache, fever, behavioral abnormalities and intellectual decline, followed by hoarseness, blurred vision, disturbance of consciousness as well as seizures. Magnetic resonance imaging (MRI) involved multiple regions (*e.g.*, the parietal lobe, frontal lobe, midbrain, thalamus, cerebellum and medulla oblongata). From this case, we recommend the simultaneous detection of viruses, autoimmune encephalitis-associated antibodies and central nervous system demyelination-associated antibodies for patients suspected of having central nervous system demyelinating disease or anti-NMDARe. The aim is to increase the understanding of autoimmune encephalitis overlap syndrome as their clinical and prognostic features may differ from those of single-antibody disease.

CASE PRESENTATION

Chief complaints

A 29-year-old man presented to the Neurology Department of our hospital complaining of headache, fever, intermittent abnormal behavior, decreased intelligence, limb twitching and loss of consciousness. During his presentation, he experienced aggravated symptoms.

The patient was admitted to the hospital for the second time for abnormal mental behavior and increased limb movements.

The patient was admitted for hoarseness and double vision for the third time. During his presentation, the patient's visual acuity further decreased.

History of present illness

The patient began to experience symptoms of headache, fever, nausea and vomiting 7 d before admission. He experienced limb weakness, intermittent behavioral abnormalities and decreased intelligence 4 d before admission. He experienced limb twitching and loss of consciousness 2 d before admission.

History of past illness

The patient had a history of previous surgery for otitis media.

Personal and family history

The daughter of the uncle in the family suffered from lupus erythematosus.

Physical examination

First admission: Clear consciousness, poor orientation to time, place and personality, poor numeracy and unremarkable physical examination.

Second admission: Intermittent clear consciousness, uncooperative rest of nervous system.

Third admission: Horizontal movement of the eyeball was limited, nystagmus to the left in left vision, nystagmus to the right in right vision, vertical nystagmus in upper and lower visions, decreased lateral acupuncture sensation in bilateral face, weak closure of left eyelid, less sensitive corneal reflex, left central facial paralysis, less powerful elevation of right soft palate, left deviation of uvula, left muscle strength grade 4, less stable finger and nose, decreased tendon reflexes in four extremities and positive Babinski sign on the left side were identified.

Laboratory examinations

First admission: Mycobacterium tuberculosis antibody detection reported no abnormality. Cerebrospinal fluid examination revealed: white blood cells $40 \times 10^6/L$; total protein 0.4 g/L; glucose 3.12 mol/L; and chloride 126.9 mmol/L. External examination of cerebrospinal fluid and serum results revealed: serum NMDAR antibody (Ab) (-); cerebrospinal fluid NMDAR-Ab (+) 1:10; cerebrospinal fluid herpes simplex virus antibody (HSV1, II IgG, IgM) (-); rubella virus antibody (RVIG, IgM) (-); cytomegalovirus (CMVIG, IgM) (-); Epstein-Barr virus (EBV) early antigen antibody IgG, IgM, IgA (-); EBV virus capsid antigen antibody IgM, IgA (-); and EBV virus capsid antigen antibody IgG (+).

Second admission: The results of autoimmune encephalitis antibody were serum NMDAR-Ab weakly positive and cerebrospinal fluid NMDAR-Ab positive.

Third admission: Serum anti-MOG (+) 1:10 and NMDAR antibody (+) 1:10 were examined.

Imaging examinations

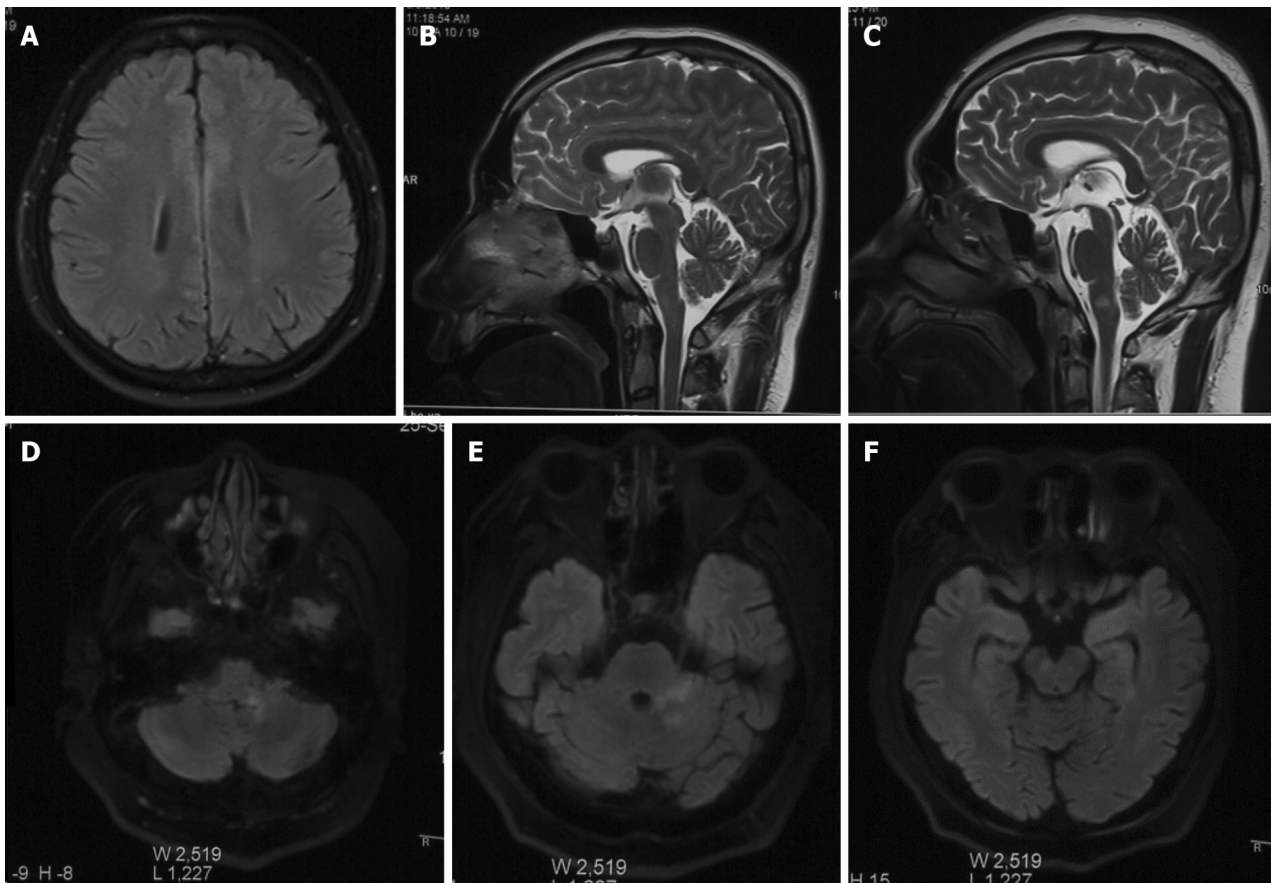
First admission: Head MRI, chest X-ray and electroencephalography were normal. Re-examination of cranial MRI showed punctate abnormal signals in the left parietal lobe (Figure 1A).

Second admission: Examination of electroencephalography and cranial MRI showed no abnormality (Figure 1B).

Third admission: Examination of cranial MRI showed abnormal signals in the medulla oblongata and right frontal lobe (Figure 1C), and synoptophore examination indicated concomitant esotropia. In such a period, the re-examination of cranial MRI + enhancement reported multiple scattered speckled and patchy abnormal signals in the medulla oblongata, left pons arm, left cerebellum and right midbrain (Figure 1D-F).

MULTIDISCIPLINARY EXPERT CONSULTATION

Lin Wang, MD, Chief Physician, Department of Neurology, Beijing Xuanwu Hospital. The patient confirmed the diagnosis of anti-NMDAR for first admission. The patient should undergo medical treatment with methylprednisolone and gamma globulin pulse therapy and olanzapine to improve sleep. In addition, this patient required regular re-examination of electroencephalography.



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Figure 1 Imaging changes in the pathogenesis of overlapping syndrome. A: Punctate abnormality in left parietal lobe (first episode); B: Normal sagittal position; C: High signal intensity was identified in the medulla oblongata in the T2 sagittal view; D: High signal intensity was identified in the left medulla oblongata and cerebellum of Flair; E: Flair showed hyperintensity in the left pontine arm and left cerebellum; F: Flair showed hyperintensity in the right midbrain.

Hongzhi Guan, MD, Professor and Chief, Department of Central Nervous System Infection, Beijing Xiehe Hospital. The patient confirmed the diagnosis of recurrent anti-NMDAR for second admission. The patient had psychiatric symptoms, language disorder, autonomic dysfunction and other symptoms in this attack, which were considered to be comprehensive recurrent type. First, the presence of tumors in the patient's body was assessed, gamma globulin and hormone pulse therapy were standardized in those without tumors, and the hormone dose was reduced to 75 mg, 1 tablet every 2 wk. At the same time, according to the consensus, immunosuppressant (mofetil) 1-2 mg/d, orally for at least 1 year, antiepileptic treatment with sodium valproate and olanzapine increased to 2 mg/time to control psychiatric symptoms.

FINAL DIAGNOSIS

The final diagnosis of the presented case was MOG antibody-related inflammatory demyelinating disease of the central nervous system complicated with anti-NMDAR overlap syndrome.

TREATMENT

The patient underwent medical treatment with methylprednisolone and gamma globulin pulse therapy and olanzapine to improve sleep after the first admission. The patient was assessed to be tumor-free at the second admission and given standard gamma globulin and steroid pulse therapy with a steroid dose reduced to 75 mg, 1 tablet every 2 wk. At the same time, according to the consensus, immunosuppressive agents (mofetil) 1-2 mg/d, orally for at least 1 year and antiepileptic treatment with sodium valproate and olanzapine increased to 2 mg/time to control psychiatric symptoms was prescribed. At the last admission, the patient was successfully treated with methylprednisolone, gamma globulin pulse therapy and rituximab treatment.

OUTCOME AND FOLLOW-UP

The patient had an uneventful clinical course, whilst dexamethasone was decreased progressively until its cessation. At the follow-up visit 1 year after hospital discharge, the patient was asymptomatic. An MRI scan showed complete removal of the lesion. However, we observed scattered red rashes on both upper limbs and trunk. Since dermoscopy showed scattered red spots and plaque changes on the glans penis and ventral surface of the extremities and a few scales, the diagnosis of psoriasis was considered. Halometasone ointment was applied externally.

DISCUSSION

The concept of anti-NMDARe was first introduced in 2007 by Dalmau *et al*[4]. MOG antibodies are related to demyelinating diseases of the central nervous system. Therefore, the concept of MOG antibody-related demyelinating diseases of the central nervous system (MOG antibody disease) was proposed[6,7]. Some patients suffering anti-NMDARe have positive serum MOG antibody, and some patients suffering MOG antibody have positive cerebrospinal fluid anti-NMDAR antibody, which is called MOG antibody disease with anti-NMDARe overlap syndrome (MNOS)[1,8,9]. In several individuals, anti-NMDARe may occur with MOG antibody disease sequentially or simultaneously[1-3]. However, there have been rare reports of recurrent anti-NMDARe with MOG antibody disease overlap syndrome worldwide.

Encephalitis is a neurological disorder caused by diffuse or multiple inflammatory lesions of the brain parenchyma. Among them, autoimmune encephalitis generally refers to a type of encephalitis mediated by autoimmune mechanisms[10]. At present, the proportion of autoimmune encephalitis accounts for 10%-20% of encephalitis cases, of which anti-NMDARe is the most common, accounting for about 80% [11,12]. Autoimmune encephalitis should be differentiated from central nervous system infections caused by herpes simplex encephalitis, epidemic encephalitis B, neurosyphilis, bacteria, fungi, parasites, Creutzfeldt-Jakob disease and the presence or absence of opportunistic infectious diseases associated with immunosuppressive or anti-tumor agents[13,14].

Cerebrospinal fluid antibodies were negative in the acute phase of the above infectious diseases[15]. In this case, relevant examinations such as cerebrospinal fluid cytology, culture, virus, antibody, cranial MRI, electroencephalogram, tumor screening [tumor markers, chest computed tomography, scrotum, both kidneys, hepatobiliary b-ultrasound] and positron emission tomography-computed tomography were perfected for differential significance[9,16]. We report a young man who initially presented with headache, fever and epilepsy as the first symptoms, followed by behavioral abnormalities, intellectual decline, dyskinesia and decreased autonomic function in accordance with the course of "bimodal encephalitis" reported in the literature[17]. Combined with cerebrospinal fluid NMDAR antibody (+) 1:10, EBV viral capsid antigen antibody IgG (+), negative tumor screening program and other examinations, it was considered to be anti-NMDARe secondary to non-tumor viral encephalitis. The disadvantage of this case is that metagenomic next-generation sequencing was not further refined to identify the presence of other bacterial or viral infections.

Five months after improvement of treatment, the patient once again developed psychiatric symptoms and increased limb movements, and the cerebrospinal fluid NMDAR antibody (+) was 1:10. Given the definition of recurrent anti-NMDARe, *i.e.* new symptoms not able to be explained by other reasons or aggravation of original symptoms were identified 2 mo after the improvement of NMDARe treatment[2,10], the diagnosis of recurrent anti-NMDARe could be confirmed. Subsequently, the patient developed hoarseness and double vision, and the re-examination of cranial MRI + enhancement indicated new lesions. On the whole, anti-NMDARe was not related to optic nerve damage and sensory disturbance in clinical practice, and patients suffering demyelinating diseases of the central nervous system are considered to be combined with MRI and clinical manifestations. The detection of serum MOG antibody indicated MOG (+) 1:10, by complying with the diagnostic criteria of MOG antibody disease[18]. Then diagnosis of anti-NMDARe with MOG antibody disease overlap syndrome was confirmed.

Characteristics of this case include: (1) Etiology: it has been reported in the literature that anti-NMDARe is related to tumors, but the incidence of tumors detected in patients suffering MNOS is small, and the prognosis is good[2,10,19]. The present patient agreed with previous literature reports in which no tumor was detected during a 2-year course; (2) Affected population: MOG antibody disease and anti-NMDARe are usually more common in women, and the incidence of MNOS in children is higher than that in adults[1,5,9]. However, the patient in this case was an adult male, it was relatively rare; (3) Clinical manifestations: the clinical symptoms of recurrent anti-NMDARe are mild, overall manifested as a single symptom, which is mild when recurrent[10,20]. Nevertheless, this patient was inconsistent with existing literature reports, showing psychiatric symptoms, language impairment and autonomic dysfunction. At the time of recurrence, he displayed considerable clinical symptoms, *i.e.* comprehensive recurrent anti-NMDARe; (4) MRI findings: the cranial MRI of patients suffering anti-NMDARe may be unremarkable, or there may be only scattered cortical and subcortical dot-like abnormalities[4,20]. The first two episodes in this patient were consistent with the findings in previous

reports. All patients suffering MNOS will have supratentorial lesions and less infratentorial lesions[1], but both supratentorial and infratentorial cranial MRI were involved in this patient; (5) Prognosis: the optic nerve injury and encephalitis of this patient recovered completely, thereby not complying with the findings of Titulaer *et al*[2], who found that patients suffering MNOS had a delayed recovery from demyelinating disease and a more pronounced residual deficit; and (6) Concomitant disease: At present, anti-NMDAR secondary to EBV-related viral encephalitis has not been reported worldwide, and psoriasis was reported by dermatoscopy during the 6-mo follow-up of the patient. Psoriasis[21] is an immune-mediated polygenic genodermatosis, which may be the result of a combination of genetic, environmental and immunological factors. To the best of the authors' knowledge, there have been no reported related cases worldwide.

CONCLUSION

In clinical practice, simultaneous detection of viruses, autoimmune encephalitis-related antibodies and central nervous system demyelination-related antibodies is recommended for patients suffering from suspected central nervous system demyelinating disease or anti-NMDAR. First, when the patient has a typical course of "bimodal symptoms," *i.e.* the first peak has "fever, psycho-behavioral abnormalities, epilepsy" as the symptoms and the second peak has "psycho-behavioral abnormalities, memory loss, dyskinesia, autonomic dysfunction" as the primary symptoms to consider autoimmune encephalitis secondary to viral encephalitis. Second, when anti-NMDAR patients are identified to develop symptoms involving the optic nerve and spinal cord (*e.g.*, decreased visual acuity, limb motor or sensory impairment), the coexistence of MOG antibody disease should be considered. Third, when patients suffering MOG antibody disease develop encephalitis symptoms (*e.g.*, psycho-behavioral abnormalities or cognitive impairment) and novel lesions are seen on cranial MRI, anti-NMDAR coexistence should be considered.

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FOOTNOTES

Author contributions: Yin XJ, Bao LH and Li BX, were the patient's physician, reviewed the literature and contributed to manuscript drafting; Feng ZC and Zhang J performed and analyzed the magnetic resonance imaging; Zhang LF and Chen JH were responsible for the revision of the manuscript for important intellectual content; All authors issued final approval for the version to be submitted.

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REFERENCES

- 1 **Fan S**, Xu Y, Ren H, Guan H, Feng F, Gao X, Ding D, Fang F, Shan G, Guan T, Zhang Y, Dai Y, Yao M, Peng B, Zhu Y, Cui L. Comparison of myelin oligodendrocyte glycoprotein (MOG)-antibody disease and AQP4-IgG-positive neuromyelitis optica spectrum disorder (NMOSD) when they co-exist with anti-NMDA (N-methyl-D-aspartate) receptor encephalitis. *Mult Scler Relat Disord* 2018; **20**: 144-152 [PMID: [29414288](#) DOI: [10.1016/j.msard.2018.01.007](#)]
- 2 **Titulaer MJ**, Höftberger R, Iizuka T, Leypoldt F, McCracken L, Cellucci T, Benson LA, Shu H, Irioka T, Hirano M, Singh G, Cobo Calvo A, Kaida K, Morales PS, Wirtz PW, Yamamoto T, Reindl M, Rosenfeld MR, Graus F, Saiz A, Dalmau J. Overlapping demyelinating syndromes and anti-N-methyl-D-aspartate receptor encephalitis. *Ann Neurol* 2014; **75**: 411-428 [PMID: [24700511](#) DOI: [10.1002/ana.24117](#)]
- 3 **Sarigecili E**, Cobanogullari MD, Komur M, Okuyaz C. A rare concurrence: Antibodies against Myelin Oligodendrocyte Glycoprotein and N-methyl-d-aspartate receptor in a child. *Mult Scler Relat Disord* 2019; **28**: 101-103 [PMID: [30590238](#) DOI: [10.1016/j.msard.2018.12.017](#)]
- 4 **Dalmau J**, Tüzün E, Wu HY, Masjuan J, Rossi JE, Voloschin A, Baehring JM, Shimazaki H, Koide R, King D, Mason W, Sansing LH, Dichter MA, Rosenfeld MR, Lynch DR. Paraneoplastic anti-N-methyl-D-aspartate receptor encephalitis associated with ovarian teratoma. *Ann Neurol* 2007; **61**: 25-36 [PMID: [17262855](#) DOI: [10.1002/ana.21050](#)]
- 5 **Pérez CA**, Agyei P, Gogia B, Harrison R, Samudralwar R. Overlapping autoimmune syndrome: A case of concomitant anti-NMDAR encephalitis and myelin oligodendrocyte glycoprotein (MOG) antibody disease. *J Neuroimmunol* 2020; **339**: 577124 [PMID: [31837635](#) DOI: [10.1016/j.jneuroim.2019.577124](#)]
- 6 **Reindl M**, Waters P. Myelin oligodendrocyte glycoprotein antibodies in neurological disease. *Nat Rev Neurol* 2019; **15**: 89-102 [PMID: [30559466](#) DOI: [10.1038/s41582-018-0112-x](#)]
- 7 **Rojc B**, Podnar B, Graus F. A case of recurrent MOG antibody positive bilateral optic neuritis and anti-NMDAR encephalitis: Different biological evolution of the two associated antibodies. *J Neuroimmunol* 2019; **328**: 86-88 [PMID: [30599296](#) DOI: [10.1016/j.jneuroim.2018.12.003](#)]
- 8 **Weber MS**, Derfuss T, Metz I, Brück W. Defining distinct features of anti-MOG antibody associated central nervous system demyelination. *Ther Adv Neurol Disord* 2018; **11**: 1756286418762083 [PMID: [29623106](#) DOI: [10.1177/1756286418762083](#)]
- 9 **Abboud H**, Probasco JC, Irani S, Ances B, Benavides DR, Bradshaw M, Christo PP, Dale RC, Fernandez-Fournier M, Flanagan EP, Gadoth A, George P, Grebenciucova E, Jammoul A, Lee ST, Li Y, Matello M, Morse AM, Rae-Grant A, Rojas G, Rossman I, Schmitt S, Venkatesan A, Vernino S, Pittcock SJ, Titulaer MJ; Autoimmune Encephalitis Alliance Clinicians Network. Autoimmune encephalitis: proposed best practice recommendations for diagnosis and acute management. *J Neurol Neurosurg Psychiatry* 2021; **92**: 757-768 [PMID: [33649022](#) DOI: [10.1136/jnnp-2020-325300](#)]
- 10 **Dalmau J**, Armangué T, Planagumà J, Radosevic M, Mannara F, Leypoldt F, Geis C, Lancaster E, Titulaer MJ, Rosenfeld MR, Graus F. An update on anti-NMDA receptor encephalitis for neurologists and psychiatrists: mechanisms and models. *Lancet Neurol* 2019; **18**: 1045-1057 [PMID: [31326280](#) DOI: [10.1016/S1474-4422\(19\)30244-3](#)]
- 11 **Armangué T**, Spatola M, Vlasea A, Mattozzi S, Cárceles-Cordon M, Martínez-Heras E, Llufríu S, Muchart J, Erro ME, Abaira L, Moris G, Monros-Giménez L, Corral-Corral Í, Montejo C, Toledo M, Bataller L, Secondi G, Ariño H, Martínez-Hernández E, Juan M, Marcos MA, Alsina L, Saiz A, Rosenfeld MR, Graus F, Dalmau J; Spanish Herpes Simplex Encephalitis Study Group. Frequency, symptoms, risk factors, and outcomes of autoimmune encephalitis after herpes simplex encephalitis: a prospective observational study and retrospective analysis. *Lancet Neurol* 2018; **17**: 760-772 [PMID: [30049614](#) DOI: [10.1016/S1474-4422\(18\)30244-8](#)]
- 12 **Graus F**, Titulaer MJ, Balu R, Benseler S, Bien CG, Cellucci T, Cortese I, Dale RC, Gelfand JM, Geschwind M, Glaser CA, Honnorat J, Höftberger R, Iizuka T, Irani SR, Lancaster E, Leypoldt F, Prüss H, Rae-Grant A, Reindl M, Rosenfeld MR, Rostásy K, Saiz A, Venkatesan A, Vincent A, Wandinger KP, Waters P, Dalmau J. A clinical approach to diagnosis of autoimmune encephalitis. *Lancet Neurol* 2016; **15**: 391-404 [PMID: [26906964](#) DOI: [10.1016/S1474-4422\(15\)00401-9](#)]
- 13 **Armangué T**, Leypoldt F, Málaga I, Raspall-Chaure M, Martí I, Nichter C, Pugh J, Vicente-Rasoamala M, Lafuente-Hidalgo M, Macaya A, Ke M, Titulaer MJ, Höftberger R, Sheriff H, Glaser C, Dalmau J. Herpes simplex virus encephalitis is a trigger of brain autoimmunity. *Ann Neurol* 2014; **75**: 317-323 [PMID: [24318406](#) DOI: [10.1002/ana.24083](#)]
- 14 **Xu CL**, Liu L, Zhao WQ, Li JM, Wang RJ, Wang SH, Wang DX, Liu MY, Qiao SS, Wang JW. Anti-N-methyl-D-aspartate receptor encephalitis with serum anti-thyroid antibodies and IgM antibodies against Epstein-Barr virus viral capsid antigen: a case report and one year follow-up. *BMC Neurol* 2011; **11**: 149 [PMID: [22126669](#) DOI: [10.1186/1471-2377-11-149](#)]
- 15 **Berger B**, Pytlík M, Hottenrott T, Stich O. Absent anti-N-methyl-D-aspartate receptor NR1a antibodies in herpes simplex virus encephalitis and varicella zoster virus infections. *Int J Neurosci* 2017; **127**: 109-117 [PMID: [26887329](#) DOI: [10.3109/00207454.2016.1147447](#)]
- 16 **Ellul M**, Solomon T. Acute encephalitis - diagnosis and management. *Clin Med (Lond)* 2018; **18**: 155-159 [PMID: [29626021](#) DOI: [10.7861/clinmedicine.18-2-155](#)]
- 17 **Shu Y**, Qiu W, Zheng J, Sun X, Yin J, Yang X, Yue X, Chen C, Deng Z, Li S, Yang Y, Peng F, Lu Z, Hu X, Petersen F, Yu X. HLA class II allele *DRB1*16:02* is associated with anti-NMDAR encephalitis. *J Neurol Neurosurg Psychiatry* 2019; **90**: 652-658 [PMID: [30636700](#) DOI: [10.1136/jnnp-2018-319714](#)]
- 18 **Jarius S**, Paul F, Aktas O, Asgari N, Dale RC, de Seze J, Franciotta D, Fujihara K, Jacob A, Kim HJ, Kleiter I, Kümpfel T, Levy M, Palace J, Ruprecht K, Saiz A, Trebst C, Weinschenker BG, Wildemann B. MOG encephalomyelitis: international recommendations on diagnosis and antibody testing. *J Neuroinflammation* 2018; **15**: 134 [PMID: [29724224](#) DOI: [10.1186/s12974-018-1144-2](#)]
- 19 **Ishikawa N**, Tajima G, Hyodo S, Takahashi Y, Kobayashi M. Detection of autoantibodies against NMDA-type glutamate

- receptor in a patient with recurrent optic neuritis and transient cerebral lesions. *Neuropediatrics* 2007; **38**: 257-260 [PMID: 18330842 DOI: 10.1055/s-2007-1004521]
- 20 **Titulaer MJ**, McCracken L, Gabilondo I, Armangué T, Glaser C, Iizuka T, Honig LS, Benseler SM, Kawachi I, Martinez-Hernandez E, Aguilar E, Gresa-Arribas N, Ryan-Flourance N, Torrents A, Saiz A, Rosenfeld MR, Balice-Gordon R, Graus F, Dalmau J. Treatment and prognostic factors for long-term outcome in patients with anti-NMDA receptor encephalitis: an observational cohort study. *Lancet Neurol* 2013; **12**: 157-165 [PMID: 23290630 DOI: 10.1016/S1474-4422(12)70310-1]
- 21 **Boehncke WH**, Schön MP. Psoriasis. *Lancet* 2015; **386**: 983-994 [PMID: 26025581 DOI: 10.1016/S0140-6736(14)61909-7]



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