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Anti-NMDAR Encephalitis in a Young Woman: A Case Report of Rapid Neuropsychiatric Decline and Recovery with Early Immunotherapy

Tasya Rahmani[1-3], Arie Khairani[1,3] Paulus Sugianto[2-3]

[1]Department of Neurology, Prof. Dr. dr. Mahar Mardjono National Brain Center Hospital, Jakarta, Indonesia
[2]Department of Neurology, Dr Soetomo General Academic Hospital, Surabaya, Indonesia
[3]Department of Neurology, Faculty of Medicine – Airlangga University, Surabaya, Indonesia
Corresponding:
[1.]Arie Khairani, Department of Neurology, National Brain Center Hospital Dr. dr. Mahar Mardjono, Faculty of Medicine, Universitas Airlangga, Jalan MT Haryono St No.Kav.11, Cawang, Kramat Jati, East Jakarta City, Jakarta, Indonesia 13630,e-mail: ariekhairani@gmail.com
[2.]Paulus Sugianto, Department of Neurology, Dr. Soetomo General Academic Hospital / Department of Neurology, Faculty of Medicine, Universitas Airlangga, Jalan Prof. Dr. Moestopo No. 6-8, Surabaya, Indonesia 60286, Phone: +62-898-9359-888, e-mail: paulus.sugianto@gmail.com

ABSTRACT

Introduction: Anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis is an autoimmune encephalitis caused by antibodies targeting NMDA receptors in the brain. It often affects young females and presents with psychiatric symptoms, seizures, movement disorders, and cognitive impairment. Early recognition and immunotherapy are essential to prevent long-term neurological sequelae.

Presentation: A 17-year-old previously healthy girl presented with a single episode of generalized tonic-clonic seizure, followed by acute behavioral changes within one week. She developed oromotor automatism, speech difficulty, sleep disturbance, and disorientation. Prior to admission, she experienced intermittent fever, runny nose, and headache. On examination, her Glasgow Coma Scale was E4V3M5 with no meningeal signs. Brain MRI was normal, while cerebrospinal fluid (CSF) analysis showed lymphocytic predominance and was positive for anti-NMDAR antibodies. EEG revealed frequent slow-wave activities with possible epileptiform discharges over the bifrontal regions. She was treated with intravenous methylprednisolone (1 g/day for five days) and intravenous immunoglobulin (2 g/kg over five days). Antiepileptic therapy (valproic acid, diazepam, trihexyphenidyl) was continued. The patient's consciousness and communication improved, and behavioral symptoms subsided.

Discussion: This case highlights the importance of considering anti-NMDAR encephalitis in adolescents presenting with seizures and acute psychiatric or cognitive disturbances. Normal MRI findings do not exclude the diagnosis, which relies on CSF antibody testing. Early combined immunotherapy leads to excellent outcomes. Tumor screening, especially for ovarian teratoma, remains a critical component of management.

KEYWORDS: Anti-NMDAR encephalitis; autoimmune encephalitis; adolescent; seizure; behavioral changes; immunotherapy; case report.

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INTRODUCTION

Anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis is an autoimmune meningoencephalitis characterized by psychiatric symptoms, seizures, movement disorders, and autonomic dysfunction [1,2]. It predominantly affects young women but can occur at any age [3]. Early recognition is crucial, as timely immunotherapy and tumor removal significantly improve outcomes [4]. Diagnosis relies on clinical suspicion, cerebrospinal fluid antibody detection, and exclusion of infectious causes [1,5]. Recent studies highlight expanding clinical spectra and evolving management strategies emphasizing standardized, multidisciplinary approaches to optimize prognosis [2–4]. Reporting atypical cases enhances understanding of this treatable yet potentially severe disorder [1,3].

CASE REPORT

A 17-year-old 17 years old previously healthy girl who presented with seizure 1x with semiology was GTCS, and she has acute progressive behaviour changes within 1 week prior to current hospital admission. She also showed fingers and oromotor automatism, with speech difficulty and sleep disturbance. The patient had a history of intermittent fever, followed by a runny nose and headache. She denied having a prolonged cough or significant weight loss. After her consciousness improved, the patient exhibits significant memory impairment, often forgetting names, places, and familiar people. At times, the patient becomes angry without any clear reason, and occasionally appears sad or tearful. Despite care and orientation efforts, the patient continues to

show disorientation to time, place, and person. Additionally, the patient tends to become irritable and may have sudden outbursts of anger without identifiable triggers. The patient born at full term, received complete immunizations. Her growth and developmental milestones were normal, with no delays in social, motor, or language aspects. She has a history of ovarian cysts that began two months prior to hospital admission. She is currently on VPA 3x5 ml (17,8mg/kg/d), Diazepam 3x5 mgr (0,27mg/kg/d) and Trihexyphenydyl 2x2mg (0,07 mg/kg/d).

On examination, the Glasgow coma scale score was recorded as E4V3M5, with normal-sized, reactive pupils, and no signs of meningeal irritation. Magnetic resonance imaging (MRI) brain revealed normal. Cerebrospinal fluid (CSF) analysis showed 1 cells (0% polymorphs and 100% lymphocytes), sugar: 78 mg/dL (blood sugar: 104 mg/dL), and protein: 38 mg/dL. Her CSF tested positive for anti-NMDAR antibodies. Continuous electroencephalogram monitoring revealed frequent slow activities with possible EDB (Extreme Delta Brush) over the bi-frontal regions. Magnetic resonance study of the brain was beyond normal limit.

The patient was diagnosed as anti-NMDAR encephalitis. She was started on on intravenous methylprednisolone 1 g/daily for five days in conjunction with intravenous immunoglobulin infusion (2 g/kg body weight over five days), also OAE was continued as follows VPA 3x5 ml (17,8mg/kg/d), Diazepam 3x5 mgr (0,27mg/kg/d) and Trihexyphenydyl 2x2mg (0,07 mg/kg/d).

The patient's level of consciousness has improved. She is now able to communicate coherently and no longer exhibits episodes of irritability or anger. The patient completed treatment without residual symptoms.

DISCUSSION

Anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis is an autoimmune disorder characterized by antibodies targeting NMDA receptors in the brain, leading to neuropsychiatric and neurological symptoms[1]. The presented case involves a previously healthy 17-year-old girl who developed seizures, behavioral changes, and cognitive dysfunction consistent with anti-NMDAR encephalitis. Early manifestations, including generalized tonic-clonic seizure (GTCS), behavioral alteration, oromotor automatism, and speech disturbance, are typical of the disease's acute phase[2]. The patient's normal MRI findings and cerebrospinal fluid (CSF) analysis showing lymphocytic predominance align with known diagnostic features, while the detection of anti-NMDAR antibodies in CSF confirmed the diagnosis[3].

The pathophysiology of anti-NMDAR encephalitis involves antibody-mediated internalization of NMDA receptors, resulting in disrupted synaptic transmission and neuropsychiatric symptoms such as agitation, psychosis, and memory loss[4]. The patient's episodes of irritability, emotional lability, and disorientation are consistent with limbic system involvement. Although ovarian teratoma is a well-known paraneoplastic trigger, this patient's ovarian cyst was likely non-teratomatous, as no mass-related complications were reported. Nonetheless, screening for ovarian or other tumors remains crucial in all cases [1,4].

Treatment with first-line immunotherapy, including high-dose intravenous methylprednisolone and intravenous immunoglobulin (IVIG), is evidence-based and often leads to clinical improvement [2,5]. The patient demonstrated significant recovery after combined steroid and IVIG therapy, with restored consciousness, coherent speech, and resolution of irritability, reflecting a favorable prognosis associated with prompt treatment. Antiepileptic drugs such as valproic acid and diazepam were continued to control seizure activity during recovery.

CONCLUSION

In conclusion, this case highlights the importance of early recognition and immunotherapy in anti-NMDAR encephalitis, even when neuroimaging is unremarkable. Multidisciplinary management neurology, psychiatry, and immunology is essential to optimize outcomes and prevent relapse.

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Data availability statement
The data used to support the findings of this study are included within the article.

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Consent
Written informed consent was obtained from the patient for submission and publication of this case report and accompanying images.

Conflict of interest
none declared.

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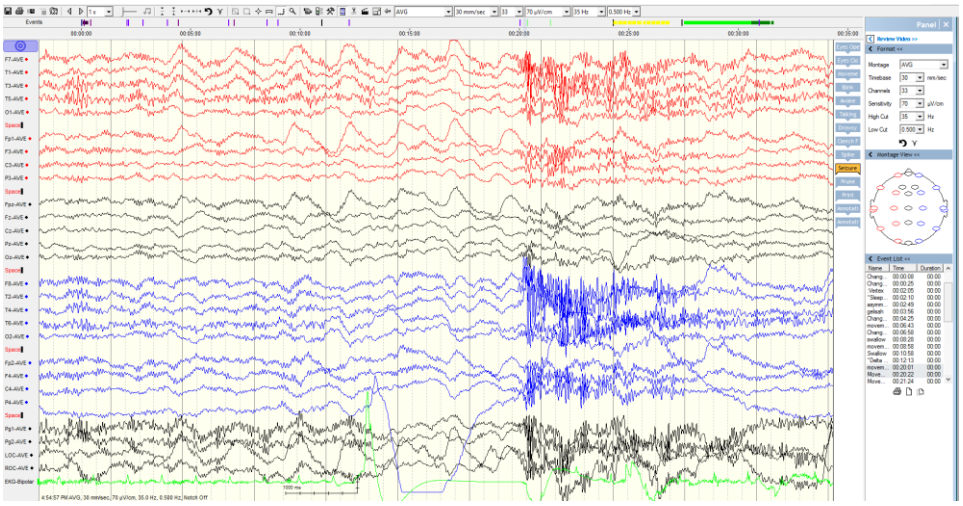

Figure 1. Electroencephalography demonstrated an frequent slow activities with possible Extreme Delta Brush

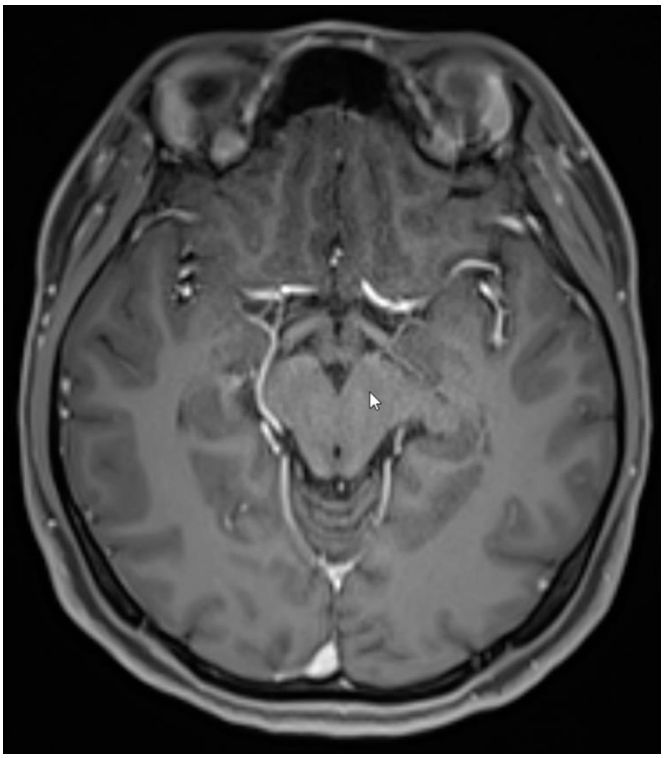

Figure 2. Magnetic resonance study of the brain was below normal limit.