VOLUME - 14, ISSUE - 03, MARCH - 2025 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Pediatrics

AUTOIMMUNE ENCEPHALITIS DIAGNOSED AS NMDAR ENCEPHALITIS IN A RURAL TERTIARY CARE HOSPITAL: A CASE REPORT ON CLINICAL ACUMEN IN LIMITED-RESOURCE SETTINGS

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ABSTRACT N-Methyl-D-Aspartate Receptor (NMDAR) encephalitis is a severe autoimmune neurological disorder characterized by neuropsychiatric symptoms, movement abnormalities, and autonomic dysfunction. Diagnosis is typically established through MRI, cerebrospinal fluid (CSF) analysis, and NMDAR antibody testing. However, in resource-limited settings, where access to comprehensive investigations is restricted, clinical judgment becomes crucial for early diagnosis and treatment. We present the case of an 8-year-old boy admitted to a rural tertiary care hospital with acute encephalopathy following a gastrointestinal illness. Despite a normal MRI and non-specific CSF findings, the diagnosis of NMDAR encephalitis was made based on clinical suspicion and confirmed by a dramatic response to immunotherapy. This case emphasizes the importance of recognizing key clinical features when diagnostic resources are limited.

KEYWORDS : NMDAR encephalitis, Autoimmune encephalitis, Clinical diagnosis, Methylprednisolone therapy

INTRODUCTION

Autoimmune encephalitis is increasingly recognized as a significant cause of acute encephalopathy in children. Among its various subtypes, **NMDAR encephalitis** is one of the most common and often presents with a combination of psychiatric symptoms, seizures, movement disorders, and autonomic dysfunction.

Although the diagnosis relies on detecting NMDAR antibodies in CSF or serum, this testing may be unavailable in resource-limited settings. Furthermore, up to 50% of patients with NMDAR encephalitis may have normal MRI findings, which can delay diagnosis. Consequently, clinicians practicing in rural healthcare centers may need to rely on clinical acumen to identify and manage NMDAR encephalitis effectively.

This case illustrates the role of clinical judgment in diagnosing NMDAR encephalitis in a rural setting with limited diagnostic resources.

Case Report

Patient Presentation

An 8-year-old boy presented to a rural tertiary care hospital with altered sensorium, slurred speech, and weakness following multiple episodes of vomiting and fever for four days. Over the following 24 hours, his neurological status deteriorated, with increasing confusion, agitation, and disorientation.

On examination, the child was febrile (101°F) and lethargic, with a **Glasgow Coma Scale (GCS)** score of 9. Neurological examination revealed generalized weakness, hypotonia, and bilateral extensor plantar responses. No signs of meningeal irritation or raised intracranial pressure were observed.

Investigations And Initial Management

Initial investigations showed:

Blood glucose: 117 mg/dL (normal)

Complete blood count: Mild leukocytosis

Electrolytes, liver, and renal profiles: Normal

CSF Analysis: Mild pleocytosis with normal glucose and marginally elevated protein; no organisms detected

A **brain MRI** was performed and was **normal**. Despite the absence of definitive imaging or CSF abnormalities, the child's persistent altered mental state and worsening neurological status prompted empirical treatment with intravenous ceftriaxone and acyclovir.

Despite this treatment, the child's neurological condition deteriorated further, with increased agitation, confusion, and speech impairment.

Clinical Suspicion And Treatment Decision

Given the combination of worsening neuropsychiatric symptoms, normal MRI, and inconclusive CSF findings, **autoimmune encephalitis**, specifically **NMDAR encephalitis**, was suspected.

Due to the unavailability of CSF NMDAR antibody testing at the rural facility, the decision to initiate **pulse-dose methylprednisolone therapy** (30 mg/kg/day) was made based on clinical judgment.

Response To Treatment

Within 48 hours of initiating corticosteroids, the child showed significant improvement in sensorium, speech, and motor function. By day five, he had regained independent mobility, and behavioral symptoms improved steadily.

Post-Treatment Course

The patient was discharged on tapering doses of oral corticosteroids with outpatient follow-up. Over the following weeks, residual behavioral changes, such as emotional instability and repetitive questioning, gradually resolved. Despite the absence of antibody confirmation, the rapid response to immunotherapy strongly supported the clinical diagnosis of **NMDAR encephalitis**.

DISCUSSION

Clinical Presentation and Diagnostic Challenges

NMDAR encephalitis commonly presents with a characteristic progression of symptoms that evolve in distinct phases:

Prodromal Phase: Often includes fever, headache, or gastrointestinal symptoms.

Early Neuropsychiatric Phase: Features agitation, confusion, speech impairment, and behavioral changes.

Advanced Phase: Includes seizures, movement disorders, and autonomic dysfunction.

In pediatric cases, the presentation can overlap with infectious encephalitis, metabolic conditions, or psychiatric

disorders. As seen in this case, a normal MRI and inconclusive CSF findings further complicated the diagnosis.

MRI Findings in NMDAR Encephalitis

Although MRI abnormalities can occasionally highlight cortical or hippocampal involvement, **up to 50% of patients have normal MRI results** (Indian Pediatrics, 2020). Consequently, a normal MRI should not exclude the possibility of NMDAR encephalitis.

Diagnostic Strategies in Resource-Limited Settings

In settings where antibody testing is unavailable, the **2016 Autoimmune Encephalitis Consensus Criteria** provides a useful clinical framework. This emphasizes:

Acute behavioral or cognitive dysfunction
Focal neurological deficits
New-onset seizures
CSF pleocytosis or MRI abnormalities

In this case, strong clinical suspicion combined with an empirical response to immunotherapy facilitated early diagnosis and treatment.

Treatment And Prognosis

Prompt initiation of immunotherapy significantly improves outcomes in NMDAR encephalitis. First-line therapies include:
High-dose corticosteroids
Intravenous immunoglobulin (IVIG)
Plasma exchange (PLEX)

Second-line agents such as rituximab or cyclophosphamide are reserved for refractory cases.

In this case, early corticosteroid administration led to rapid clinical improvement, reinforcing the importance of timely intervention.

According to Indian Pediatrics (2020), over **80% of children with NMDAR encephalitis** achieve good long-term recovery with early immunotherapy, although residual cognitive and behavioral symptoms may persist.

CONCLUSION

This case underscores the vital role of clinical judgment in diagnosing NMDAR encephalitis in resource-limited settings. Despite a normal MRI and inconclusive CSF findings, the patient's presentation, coupled with neurological deterioration and subsequent improvement following immunotherapy, supported the diagnosis. This case highlights the need for healthcare providers in rural settings to maintain a high index of suspicion for autoimmune encephalitis in patients with unexplained encephalopathy. Early initiation of immunotherapy, guided by clinical acumen, can be crucial in achieving positive outcomes when advanced diagnostic tools are unavailable.

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