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Autoimmune Encephalitis with Hypertension: A Case Report

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ABSTRACT

Autoimmune encephalitis (AIE) is being increasingly recognized as a significant as well as frequent cause of encephalopathy in the pediatric age group. The most common antibody associated with AIE in children is anti-NMDA receptor (NMDA Receptor) antibody. The patients usually present with a subacute onset of behavioral disorder, psychiatric manifestation, encephalopathy or movement disorder (MD).

Keywords: Autoimmune Encephalitis, Anti-N-methyl-D- aspartic acid receptor, Seizures, Movement Disorder, Pediatric.

INTRODUCTION

Autoimmune encephalitis (AIE) is a type of antibody-mediated inflammatory disorder of the central nervous system[1]. Autoimmune encephalitis can be divided into two major groups according to their pathophysiology: (a) associated with antibodies against intracellular antigens and (b) associated with antibodies against neuronal cell-surface or synaptic receptors[2]. The disease spectrum of AIE has been expanding since the first case of the anti-N-methyl-D-aspartic acid receptor (NMDA Receptor) encephalitis was identified[3]. Anti-NMDA Receptor encephalitis accounts for 4% of all encephalitis and is the most common cause of seropositive AIE in children[4]. AIE is manifested by various neurological and psychiatric symptoms. There is involvement of the limbic system, characterized by amnesia, confusion, epileptic seizures, as well as extra-limbic brain structures[1]. The onset of symptoms is subacute (< three months) and may be subsequent to events like infections, fever or traumas[2]. Diagnosing AIE is challenging because of overlap in clinical presentations between the types of AIE, other inflammatory brain diseases, infections, metabolic diseases, and psychiatric disorders[5]. Increased awareness of autoimmune encephalitis, early recognition, and timely completion of relevant antibody tests can improve the diagnosis rate of the disease[3]. The International Encephalitis Consortium 2013 diagnostic criteria for encephalitis of presumed infectious or autoimmune etiology, the criteria required modification to be applied to children. For example, deficits in working memory are challenging to identify in younger children. Also, children are less likely to present with a well-defined neurologic syndrome and, even in anti-NMDA Receptor encephalitis, the sequence of symptom development may differ from adults[5]. Basic tenets that guide the treatment of autoimmune encephalitis in which patients treated with immunotherapy fare better than those not given immunotherapy. Earlier initiation of immune therapy is associated with better prognosis. The primary immunomodulation options include steroids, intravenous immunoglobulins or plasma exchange[4].

Hypertension in children is defined as average SBP [systolic BP (blood pressure)] and/or DBP (diastolic BP) that is ≥95th percentile for gender, age and height on ≥3 occasions[6]. The prevalence of hypertension is much higher among overweight and obese children with estimates of 4% to 14% and 11% to 23% respectively. Although recommendations for a specific first-line agent or class of agents are not available, angiotensin-converting enzyme inhibitors and calcium channel blockers were preferred. A wide variety of medications is approved for use in children and that shown to be effective in lowering BP and to be safe in the short-term. Rather, the choice of initial agent should be based on availability, clinician familiarity, and patient preferences[7].

CASE REPORT

A 1-year and 7-month-old child, first in birth order and born out of a non-consanguineous marriage was admitted to SSIMS and RC with chief complaints of cough and cold insidious in onset, progressive in nature since 1 week more in the night, wet type and not associated with the post tussive vomiting along with fever and chills since 3 days insidious in onset, progressive in nature, high grade intermittent type not relieving on medications. Also, Patient had irritability and history of decreased intake for past 2 days.

Birth History: Antenatal- Pregnancy induced Hypertension, natal- LSCS? Baby cried immediately after birth, post-natal- No NICU admission.

Developmental history: Gross motor- creeps well, walks with support, fine motor- Scribbles, tower of 3 blocks, social- comes when called.

A seizure episode occurrence 6 months ago caused the child for the admission to the hospital previously during which autoimmune encephalitis with hypertension was diagnosed for which the treatment plan included amlodipine 2.5mg 1-0-1 and syrup sodium valproate 5ml 1-0-1.

Upon head-to-toe examination, the eyes and ENT appeared normal, but brandy marks on eyebrows appeared on face. Anthropometry results showed weight- 11.75kg, height- 87.5cm, head circumference – 48cm. The pulse rate was 140 beats per minute, and Blood pressure was 109/60mmhg. The respiratory rate was 48cycles per minute. Cardiovascular examination revealed normal s1 and s2 heart sounds with no murmurs detected. Respiratory examination yielded crackle breath sound in infra-scapular region bilaterally. The abdominal examination indicated a soft and non-tender abdomen with no organomegaly.

The laboratory tests revealed several findings including the blood culture & sensitivity, which revealed presence of E. coli organism and was sensitive to beta lactam antibiotics. The patient chest X-ray findings were normal. Additionally, dengue serology was negative. Serum biochemistry and complete blood picture and urine examination revealed the following values mentioned in table 1.

After considering the patient's current health condition, past medical history and laboratory test results and by conducting a comprehensive physical examination, it was determined that the child was diagnosed with Autoimmune encephalitis with hypertension presenting with pneumonia.

TREATMENT

The treatment plan consisted of various interventions to address the condition comprehensively. To manage Hypertension, the child received Tablet Amlodipine 2.5 mg 1-0-1 orally on an as needed basis. Sodium valproate syrup of 5ml (36mg/kg/day) twice daily was prescribed for seizure, while Paracetamol syrup 3.5ml was prescribed to treat fever along with Cough war kid syrup of 3.5ml was prescribed to treat cough. Based on TLC count, ceftriaxone 500mg injection and azithromycin syrup 3ml was prescribed as an intravenous and oral antibiotic. To relieve nasal congestion due to cold saline nasal drops was prescribed. The patient was

regularly monitored for alleviation of symptoms. These treatment interventions aimed to manage hypertension, fever, cold and cough along with prevention of seizure occurrence.

Table 1. Laboratory test results.

SL NO	DIAGNOSTIC TEST	OBSERVED VALUES
Serum biochemistry		
1.	C – Reactive protein	99.70mg/L
2.	Urea	19mg/dL
3.	Creatinine	0.36mg/dL
4.	Sodium	131.8mmol/L
5.	Potassium	5.02mmol/L
6.	Chloride	99.86mmol/L
7.	Total bilirubin	0.7mg/dL
8.	Direct bilirubin	0.2mg/dL
9.	Indirect bilirubin	0.5mg/dL
10.	Total Protein	5.9gm/dL
11.	Albumin	3.5gm/dL
12.	Globulin	2.4gm/dL
13.	A/G ratio	1.50
14.	AST	19 U/L
15.	ALT	4.1U/L
16.	ALP	122.2U/L
Complete blood count		
1.	Hemoglobin	7.8gm/dL
2.	RBC	3.7millions/cu mm
3.	TLC	25400 cells/cu mm
4.	Neutrophils	74%
5.	Lymphocytes	15%
6.	Monocytes	11%
7.	Hematocrit	23.4%
8.	MCV	71.0 fl
9.	MCH	21.1pg
10.	MCHC	29.7%
11.	RDW-CV	16.4
12.	Platelets	4.33lakhs/cu mm
Urine microscopic examination		
1.	Leucocytes	1-2/ hpf
2.	RBCs	0-1/hpf

DISCUSSION

Autoimmune encephalitis (AE) in pediatric patients presents significant diagnostic and therapeutic challenges, given its diverse clinical manifestations and underlying immunopathogenesis. Pediatric AE is a rare but increasingly recognized condition that requires a multidisciplinary approach for effective diagnosis and management.

In the presented case, the clinical features align with previous reports of autoimmune encephalitis in children, including a spectrum of neuropsychiatric symptoms, seizures, and behavioral changes. The presence of these symptoms mandates timely recognition and differentiation from infectious or other neurological disorders, as highlighted by Cellucci et al., who emphasize a structured clinical approach to diagnosis using both clinical and paraclinical markers, including antibody testing and neuroimaging findings[11].The findings in this case also echo the experiences documented by Fatema and Rahman in a tertiary care setting in Bangladesh, where antibody-mediated autoimmune encephalitis demonstrated significant variability in presentation, underscoring the importance of comprehensive evaluation[1]. In particular,

Kang et al. highlight the relevance of antibody testing for identifying subtypes of AE, which informs both prognosis and management strategies[3].

From a clinical perspective, early initiation of immunotherapy, as detailed by Bien et al., is crucial to improving outcomes in pediatric AE, as delays in treatment are associated with worse prognoses[8]. The importance of therapeutic interventions, such as corticosteroids, intravenous immunoglobulin (IVIG), and plasmapheresis, has been validated across multiple studies, including those by Hon et al., which emphasize a multimodal approach tailored to the severity of the disease[9].

Moreover, the short-term prognosis in AE, discussed by Kang et al., emphasizes that most pediatric patients show a favorable response to early treatment[3]. However, long-term outcomes often depend on the promptness of intervention and the subtype of AE, as elaborated in studies by Garg et al., which also stress the need for ongoing monitoring to mitigate relapses[4]. Interestingly, Wong-Kisiel et al. provide insights into the overlap of autoimmune encephalopathies with epilepsies, which was a significant aspect of the current case[10]. Early identification of such overlap is crucial, as seizure management is integral to the overall therapeutic strategy in AE. Similarly, the guidelines provided by Mihaela Roxana Ioghen et al. underscore practical diagnostic steps, such as lumbar puncture and MRI findings, that are pivotal for confirming AE in children[2].

CONCLUSION

The presented case highlights the complexities of diagnosing and managing pediatric autoimmune encephalitis, emphasizing the importance of early recognition and intervention to improve outcomes. The diverse clinical features, including neuropsychiatric symptoms and seizures, necessitate a multidisciplinary approach for accurate diagnosis and timely initiation of immunotherapy. As supported by existing literature, antibody testing, neuroimaging, and paraclinical markers are pivotal in confirming the diagnosis and tailoring treatment strategies. Early and appropriate therapeutic interventions, such as corticosteroids, IVIG, and plasmapheresis, have shown favorable short-term outcomes. Continued awareness and research are essential to refine diagnostic protocols and improve long-term prognosis in children with autoimmune encephalitis.

Abbreviations

Sl. no	Abbreviations	Expansion
1.	AIE	Autoimmune encephalitis
2.	NMDA Receptor	N-methyl-D-aspartic acid receptor
3.	MD	movement disorder
4.	SBP	Systolic blood pressure
5.	DBP	Diastolic Blood pressure

Declaration by Authors

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