a complex case of autoimmune encephalitis with renal twist - a case report

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ABSTRACT

Autoimmune Encephalitis (AE) presents diagnostic challenges due to its diverse symptoms. We describe a case of a 32-year-old male with fever, seizures, and altered mental status, presented at Aga Khan hospital, Karachi, Pakistan. Unusual cerebrospinal fluid findings and autoimmune markers led to AE diagnosis. Autoimmune encephalitis's intersection with lupus nephritis required a multidisciplinary approach, resulting in significant improvement. This case highlights the importance of clinical suspicion and antibody testing in AE diagnosis and offers insights into evolving autoimmune disease management.

Key Words: Autoimmune Encephalitis, Lupus Nephritis, Multidisciplinary Approach

INTRODUCTION

Autoimmune Encephalitis (AE) is a dynamic and complex neurology subspecialty marked by cerebral inflammation due to an immune response against neural antigens, presenting with a spectrum of neurological symptoms, including altered mental status, seizures, and cognitive deficits (1). Autoimmune encephalitis can manifest independently or as part of systemic autoimmune disorders like systemic lupus erythematosus (SLE), impacting multiple organ systems, including the central nervous system (CNS) (2). Lupus nephritis, a prominent renal manifestation in SLE, presents an intriguing challenge for clinicians in navigating the complex relationship between autoimmune diseases and their impact on the nervous system (3). Around 1,000 cases of AE reportedly occur annually in United Kingdom, and despite its challenging course, effective treatment can lead to substantial recovery (4).

Case Presentation

A previously healthy 32-year-old male presented to a private tertiary care hospital with altered sensorium, seizures, and fever following a five-day history of fever, rigors, and chills. Initially treated at a local clinic with intravenous hydration and antimalarial treatment, his condition worsened, leading to irritability, disorientation, and a low Glasgow Coma Scale (GCS). He was subsequently intubated at another local private hospital, where cerebrospinal fluid (CSF) analysis confirmed meningoencephalitis, prompting transfer to a private tertiary care hospital for advanced care.

Case History

Upon admission to a private tertiary care hospital, a comprehensive diagnostic workup was initiated to evaluate the patient's condition further. Initial investigations included CSF studies, computed tomography (CT) head, and magnetic resonance imaging (MRI) head. The CSF analysis revealed several notable findings, including an elevated white blood cell count indicative of pleocytosis, a high protein concentration, and a decreased glucose concentration. These CSF findings were highly suggestive of a central nervous system infection.

The CT and MRI scans of the patient's head showed no intracranial hemorrhage, infarct, or mass lesions, ruling out no structural brain abnormalities. Given the complexity of the case, an autoimmune workup was subsequently initiated. This workup revealed positive results for several autoimmune markers, including Antinuclear Antibodies (ANA), Anti-Ro antibodies, Anti-Scl antibodies, and Anti-Double-Stranded DNA (ADNA) antibodies.

The patient's generalized tonic-clonic seizures (GTCs) were managed in consultation with the neurology team, who prescribed appropriate anti-epileptic drugs tailored to the patient's needs. Additionally, the rheumatology team was consulted to address the autoimmune markers detected, and the patient received pulse steroid therapy as part of the autoimmune management plan.

Furthermore, the patient developed acute kidney injury (AKI) with high anion gap metabolic acidosis (HAGMA), necessitating a nephrology consult. Comprehensive nephrological evaluation and management were initiated promptly.

After four days of intensive care and specialized treatment, the patient's condition improved, allowing for successful weaning from ventilator leading to extubation. Subsequently, the patient was transferred to a medical ward for ongoing care and further monitoring.

Physical Examination

On arrival in the ER, GCS was 2/10, and the patient was intubated and on AC/ VC mode of ventilation with a respiratory rate of 18 per minute, tidal volume of 450 per minute, and FiO2 of 50%. His blood pressure was 100/50 mmHg, Pulse was 73 per minute, and temperature was 37˚F. Pupils were bilaterally equally reactive. Skin was intact. The chest was clear, and no adventitious sounds were heard. Nasogastric tube was placed and Ensure nutritional supplement started at 40cc per hour.

Differential diagnosis:

1. Tuberculosis Meningitis
2. Encephalopathy due to lupus cerebritis Or autoimmune Encephalitis
3. Acute Kidney injury due to lupus nephritis Or drug-induced.
4. Malaria
5. Seizures

Laboratory and diagnostic test findings with rationale

Based on the presented symptoms, several diagnostic measures can be employed to investigate autoimmune encephalitis or related risk factors. The initial assessment commonly encompasses a range of examinations, including blood tests and radiological evaluations such as chest X-rays, CT head, MRI, and EEG. A summary of the investigations is presented in Tables 1 and 2.

Table. 1 Summary of diagnostic procedures of the patient

Chest X-Ray	Haziness in the left lower zone with blunting of the left costophrenic angle suggests mild pleural effusion with underlying atelectasis.
MRI Brain	There was no evidence of acute infarction, hemorrhage, or mass effect. No meningeal or parenchymal enhancement. Incidental note of small right quadrigeminal cistern lipoma.
CT Head without contrast	No acute intracranial hemorrhage, established infarct, or mass effect.
EEG	Abnormal findings were suggestive of severe encephalopathy. Burst suppression pattern (burst of theta and delta activity with variable suppression). Intermittent generalized delta bursts.

Table. 2 Summary of laboratory investigations of the patient

Labs	Value	Labs	Value
Hb	11.7g/dl ← 9.1g/dl	BUN	17mg/dl ← 53mg/dl
Hct	37.0% ← 28.1%	Cr	1.1mg/dl ← 4.0mg/dl
RBC	4.09*10E12/L ← 3.22*10E12/L	eGFR	>60ml/min ← 15.12mL/min
WBC	15.9*10E9/L ← 10.5 *10E9/L	Na	150mmol/L ← 152mmol/L
Lymphocytes	16.0% ← 19.7 %	K	4.0mmol/L ← 3.8mmol/L
Platelets	294*10E9/L ← 291 *10E9/L	Cl	104mmol/L ← 116mmol/L
SGPT	151IU/L	Bicarb	22.5mmol/L ← 19.20mmol/L
Albumin	4.4g/dl	Anion Gap	18mmol/L
s. Ionized Calcium	4.89mg/dl	Mg	2.5mg/dl ← 2.9mg/dl
Phosphorus	3.8mg/dl	Glu. Random	118mg/dl
Plasma Ammonia	50ug/dl	S.p- ANCA S c-ANCA	8.26U/ml<0.3U/mL
CRP	33.20mg/L ← 118mg/L	S. Procalci-tonin	0.14ng/mL
S.anti-dsDNA (IgG)	41.3 IU/ml	U1-RNP- An-tibodies	2.50 U/ml
		SS-A/Ro An-tibodies	59.21U/ml
		SS-B/La Anti-bodies	4.66 U/ml
		Sm- Antibod-ies	0.37 U/ml
		Scl-70 Anti-bodies	5.78 U/ml
S. Anti CCP	<8.0 U/mL	ANA Group test- Pattern	Coarse Speckled
		Estimated Endpoint Ti-ter	1/5120
		Anti-smooth muscle Anti-bodies	negative
		Anti-mito-chondrial Antibodies (AMA)	negative

Table 3. summary of Blood Gases(Last time retrieved)

PH	7.45	7.38
PCO2	33.90mmHg	34.20mmHg
PO2	74.80mmHg	207.60mmHg
Bicarbonate	22.80	19.70mEq/L
Base Excess	-0.6mEq/L	-4.6mEq/L
O2 Sat	95.50%	99.70%

Management

The patient received immediate treatment, including empiric intravenous antibiotics and antiviral therapy, to address potential causes of meningoencephalitis. Anticonvulsant medications were administered for seizure control alongside mechanical ventilation in the ICU for support. There was a positive ANA test suggesting an autoimmune disorder, and CSF analysis did not identify any specific pathogen responsible for the central nervous system infection. Close monitoring managed fluctuating hypernatremia, with no recurrent seizures after 48 hours. Rheumatology initiated pulse steroid therapy for autoimmune markers, while nephrology addressed acute kidney injury (AKI) through comprehensive management.

This collaborative, multidisciplinary approach encompassed both autoimmune aspects and AKI-related complications. As the patient's condition improved, he was extubated and achieved a GCS score of 15/15, indicating full alertness and orientation. Subsequently, the patient transitioned from the ICU to a medical ward for continued monitoring. Over three days without complications, the patient's stability allowed for discharge, marking a positive outcome. The patient was discharged with the clear guidelines to continue taking all prescribed medications. The take-home medications included prednisolone 5m/tablet, Leviteracitam tablet 500 mg/tablet, Esomeprazole 40mg/capsule, Hydralazine HCL 25mg/tablet, and Pyridoxine HCL 50 mg/tablet. The patient looked happy and stable while he was going home.

Pharmacological Therapy

Several drugs were used to treat the patient's condition. Table 3 shows the typical medications used in the treatment plan for the patient.

DISCUSSION

Diagnosing AE is complex, and successful patient outcomes fundamentally depends on early detection and treatment (5). The background of diagnosing autoimmune Encephalitis (AE) has evolved, becoming increasingly feasible due to established consensus clinical criteria and the broader availability of antibody tests (6). A high index of suspicion is vital, especially when patients initially present with psychiatric symptoms. Diagnosis often relies on subsequent neurological manifestations and supportive evidence from tests and MRI, which can occasionally yield normal results.

Accurate diagnosis involves coordinating antibody testing with a neurologist and neuro-immunology laboratory, guided by clinical assessment. Establishing a syndromic diagnosis remains a viable option in cases without detectable antibodies.

Table 3. Medicines prescribed to the patient presenting with complex encephalitis

Medications	Classification	Mechanism of Action
Pyridoxine HCL	Vitamin (Vitamin B6)	A water-soluble vitamin acts as a coenzyme in amino acid, neurotransmitter, and glycogen metabolism.
Sodium Bicarbonate	Alkalinizing agent, antacid	Sodium bicarbonate is a systemic and urinary alkalinizing agent.
Prednisolone	Corticosteroid (Glucocorticoid)	Prednisolone, a synthetic corticosteroid, exerts anti-inflammatory and immunosuppressive effects by suppressing the immune response and inflammation in various conditions.
Metoclopramide HCL	Prokinetic agent, antiemetic	Metoclopramide, a dopamine receptor antagonist in the upper digestive tract, enhances gastrointestinal motility and manages nausea and vomiting.
Ondansetron HCL	Antiemetic	Selective 5-HT3 receptor antagonist alleviates nausea and vomiting by blocking serotonin receptors in the brain and gut.
Levetiracetam	Antiepileptic (Anticonvulsant)	Levetiracetam modulates neurotransmitter release by binding to synaptic vesicle protein 2A (SV2A) and is employed for seizure control in epilepsy.
Esomeprazole	Proton Pump Inhibitor	Esomeprazole inhibits the gastric proton pump (H+/K+ ATPase), reducing stomach acid secretion, and is prescribed for conditions involving excessive gastric acid, such as GERD.
Valproate Sodium	Antiepileptic (Anticonvulsant)	Valproate sodium modulates the brain neurotransmitter GABA, reducing abnormal electrical activity, and is indicated for epilepsy and bipolar disorder.
Dioctahedral smectite	Antidiarrheal, Adsorbent	Dioctahedral smectite, a clay-based adsorbent in the gastrointestinal tract, binds to toxins and pathogens, reducing diarrhea.
Artesunate	Antimalarial	Antimalarial disrupts malaria parasite growth and reproduction in red blood cells.
Hydralazine	Antihypertensive	Hydralazine induces vasodilation by relaxing blood vessel smooth muscle, lowering blood pressure, and treating hypertension.
Ethambutol	Anti-tuberculosis Agent	Ethambutol inhibits mycobacterial cell wall synthesis, disrupting arabinogalactan and the bacterial cell wall, and is employed in tuberculosis treatment.
Isoniazid+ Rifampicin	Antituberculosis Agents	Isoniazid disrupts mycobacterial cell wall synthesis, while rifampicin inhibits bacterial RNA synthesis; combined, they are highly effective against tuberculosis.
Calcium Gluconate	Calcium Supplement	Calcium gluconate supplements calcium, treats deficiency, and stabilizes cardiac membrane potential in hyperkalemia.

Although CSF findings frequently reveal abnormalities in AE, including a mild lymphocyte increase and moderately elevated CSF protein levels, it's essential to note that up to one-third of patients may present entirely unremarkable CSF results, and this should not exclude the possibility of the diagnosis (4). The standard therapy for systemic lupus erythematosus and lupus nephritis (LN) initially involved high-dose corticosteroids, which improved 5-year survival rates for proliferative LN to 55%. However, prolonged corticosteroid use had adverse effects, including renal failure. In the 1970s, the addition of cytotoxic agents like cyclophosphamide raised 5-year survival rates to 80%. Despite this improvement, treatment failures remained common, and end-stage renal disease (ESRD) progression risk remained high(7).

CONCLUSION

In conclusion, this case underscores the complexity of diagnosing autoimmune encephalitis, emphasizing the importance of a high index of suspicion, clinical evaluation, and antibody testing. It highlights the multidisciplinary approach required for comprehensive patient care involving neurology, rheumatology, and nephrology. Additionally, it provides insights into the evolving treatment landscape, moving from corticosteroids to cytotoxic agents in lupus nephritis management. This case contributes to our understanding of AE, offering valuable lessons for improved diagnosis and patient outcomes.

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REFERENCES

1. Kelley BP, Patel SC, Marin HL, Corrigan JJ, Mitsias PD, Griffith B. Autoimmune Encephalitis: Pathophysiology and Imaging Review of an Overlooked Diagnosis. AJNR Am J Neuroradiol. 2017;38(6):1070-8.
2. Devinsky O, Schein A, Najjar S. Epilepsy associated with systemic autoimmune disorders. Epilepsy Curr. 2013;13(2):62-8.
3. Doria A, Iaccarino L, Ghirardello A, Zampieri S, Arienti S, Sarzi-Puttini P, et al. Long-term prognosis and causes of death in systemic lupus erythematosus. Am J Med. 2006;119(8):700-6.
4. Ellul MA, Wood G, Tooren HVD, Easton A, Babu A, Michael BD. Update on the diagnosis and management of autoimmune encephalitis. Clin Med (Lond). 2020;20(4):389-92.
5. Lancaster E. The Diagnosis and Treatment of Autoimmune Encephalitis. J Clin Neurol. 2016;12(1):1-13.
6. Orozco E, Valencia-Sanchez C, Britton J, Dubey D, Flanagan EP, Lopez-Chiriboga AS, et al. Autoimmune Encephalitis Criteria in Clinical Practice. Neurol Clin Pract. 2023;13(3):e200151.
7. Parikh SV, Rovin BH. Current and Emerging Therapies for Lupus Nephritis. J Am Soc Nephrol. 2016;27(10):2929-39.