The un-ending saga of seronegative autoimmune encephalitis

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ABSTRACT

Objective: To characterize the clinical presentation, diagnostic challenges, neuroimaging findings, and treatment response in patients with seronegative autoimmune encephalitis (AIE) presenting as new-onset refractory status epilepticus (NORSE) and to assess the utility of fluorodeoxyglucose positron emission tomography (FDG-PET) and electroencephalogram (EEG) in diagnosis and disease monitoring.

Background: NORSE is a life-threatening condition that often arises in the setting of AIE. While seropositive AIE has established diagnostic criteria, seronegative AIE remains a diagnostic challenge due to the absence of autoantibodies and non-specific findings on conventional investigations.

Methods: This is a prospective case series of four patients with seronegative AIE presenting as NORSE. Clinical history, cerebrospinal fluid (CSF) findings, magnetic resonance imaging (MRI), EEG, and FDG-PET results were analyzed. Immunotherapeutic interventions included intravenous immunoglobulin, corticosteroids, plasma exchange, rituximab, and tocilizumab.

Results: We present four patients with NORSE, characterized by challenging diagnoses due to negative antibodies in serological and CSF analyses. All patients exhibited normal MRI brain results. FDG PET revealed patterns of hypermetabolism or hypometabolism in sequential imaging. Therefore, indicating the potential function of FDG PET as an imaging biomarker in seronegative AIE.

Conclusion: Seronegative AIE presenting as NORSE remains a diagnostic and therapeutic challenge. Conventional MRI and CSF studies may be inconclusive, whereas FDG-PET and EEG provide valuable insights into disease activity. Early and aggressive immunotherapy can improve seizure control and clinical outcomes. Further research is needed to refine diagnostic criteria and treatment strategies for seronegative AIE.

Keywords: Autoimmune encephalitis, status epilepticus, new onset refractory status epilepticus, neuroradiology.

Type of Article: CASE SERIES **Specialty:** Immunology

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Introduction

'New-onset refractory status epilepticus (NORSE) is a clinical presentation, not a specific diagnosis, in a patient without active epilepsy or other pre-existing relevant neurological disorder, without a clear acute or active structural, toxic or metabolic, viral or autoimmune causes. This is referred to as "cryptogenic NORSE" or "NORSE of unknown cause" if no cause is identified after a thorough evaluation. The latest International League Against Epilepsy classification has incorporated "immune etiology" alongside other established causes of epilepsy (structural, genetic, infectious, and metabolic), facilitating the development of novel therapeutic options for this challenging patient cohort, as seizures in this context frequently exhibit significant responsiveness to immunotherapy [1].

There are approximately 200 uncommon causes of status epilepticus, which are categorized as inflammatory/autoimmune, unusual infections, genetic, and metabolic/toxic. A negative initial workup is present in up to 20% of patients with refractory status epilepticus; these patients account for up to 60% of de novo refractory status epilepticus, and the majority are previously healthy young adults and adolescents. Such situations are commonly designated as NORSE. In adults, the most prevalent cause of encephalitis is sporadic or paraneoplastic autoimmunity [1,2].

Table 1. *Clinical profile of the patients.*

	CASE 1	CASE 2	CASE 3	CASE 4
AGE/GENDER	**20/F TABLE 1.1**	**26/M TABLE 1.2**	**37/F TABLE 1.3**	**78/M TABLE 1.4**
Clinical presentation Duration of presenting complaints	Fever, abnormal body movements for 2 days	Fever for 10 days focal seizure followed by GTCS for 1 day	Fever, abnormal movements, altered sensorium for 5 days	One episode of seizure
Examination findings	Conscious, drowsy, follows commands,	Conscious, with myoclonic jerks gradually became unresponsive	On mechanical ventilation, disoriented, drowsy	Normal
Blood investigations (CBC, LKFT, CRP, blood and urine culture, thyroid function, vasculitis profile)	Normal	Normal	Normal	Normal
CSF analysis	Cells- 5 cells/cumm Proteins- 49 HHV 6 + ACE- normal AIE- negative	Cells-5 cells/cumm Proteins-26 Infection-negative ACE- normal AIE- negative	Cells-0 cells/cumm Proteins-21 Infection-negative ACE- normal AIE- negative	Cells-0 cells/cumm Proteins- 54 Infection-negative ACE- normal AIE- negative
Brain contrast MRI	Normal Figure 1(a)	Normal Figure 1(b)	Normal Figure 1(c)	Mild cerebral atrophy Figure 1(d)
FDG PET findings	Hypermetabolism in anterior cingulate gyrus Second PET-hypometabolism in anterior cingulate gyrus. Figure 2	Hypermetabolism in left occipital region, hypometabolism in fronto parietal lobe. Figure 3	Not done	Ist PET-heterogeneous increased metabolic uptake in right fronto-parietal cortex. 2nd PET-heterogeneously increased FDG uptake noted in left frontal lobe 3rd PET-heterogeneously increased FDG uptake in bilateral frontal lobes. Figure 4
Medical management	Levetiracetam Brivaracetam Sodium Valproate Oxcarbazepine Clobazam Parempanel Phenytoin Desvenlaflexane Flupentixol	Brivaracetam Sodium Valproate Thiopentone Clobazam Ketamine Parempanel Phenobarbitone Cannabidiol	Phenytoin Thiopentone Lacosamide Levetiracetam Midazolam Clobazam Gabapentanoids Ketamine	Levetiracetam Lacosamide Phenytoin
Immunomodulatory therapy	IVMPS IVIG- 3 cycles Rituximab	IVMPS IVIG- Induction dose PLEX- 5 cycles Tocilizumab- 400 mg	IVMPS IVIG- Induction dose	IVIG Rituximab
EEG	Slowing	Epileptiform discharges	Generalised discharges	Normal
Disease course	Ongoing	45 days	21 days	Ongoing

Seizures are a common presentation of autoimmune encephalitis (AIE), which may be focal or generalized with or without loss of consciousness. In a systematic review done in 3,722 antibodies seropositive AIE patients, seizure activity was seen in 69.9% and 84.8% had electric encephalogram (EEG) abnormality. Another study reported 81.4% of patients having seizures due to seronegative AIE. NORSE with the absence of autoantibodies makes the diagnosis and management challenging for clinicians [3].

The probable diagnosis of seronegative AIE includes the presence of focal neurological deficits, new onset seizures, cerebrospinal fluid (CSF) pleocytosis, and brain magnetic resonance imaging (MRI) consistent with AIE. Although the ongoing course might not corroborate the findings of investigations (CSF, Brain MRI, EEG), hence complicating the diagnosis of AIE [4]. This study reports four cases of NORSE, to understand the course of AIE, choice of immunomodulatory therapies, MRI, and role of Fluro deoxy glucose positron emission tomography (FDG PET) in seronegative AIE presenting as status epilepticus.

We will discuss case reports presenting as NORSE with normal brain MRI, in whom FDG PET brain and EEG

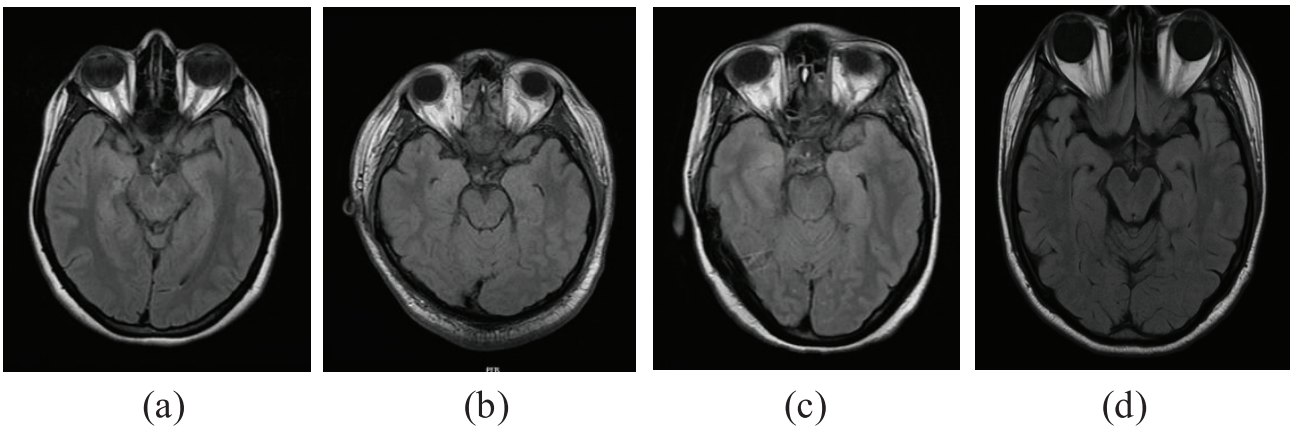

Figure 1. *(a-c) Axial FLAIR MRI of the brain in a patient with seronegative AIE. The image shows normal signal intensity in the mesial temporal lobes and basal ganglia at this level, without overt evidence of hyperintensities or oedema. Despite the absence of radiological abnormalities, the clinical presentation and CSF findings were consistent with AIE, highlighting the diagnostic challenge in seronegative cases. (d): Axial FLAIR MRI in a patient with seronegative AIE. Mild cerebral atrophy is noted with prominence of cortical sulci and ventricles, without focal signal abnormalities.*

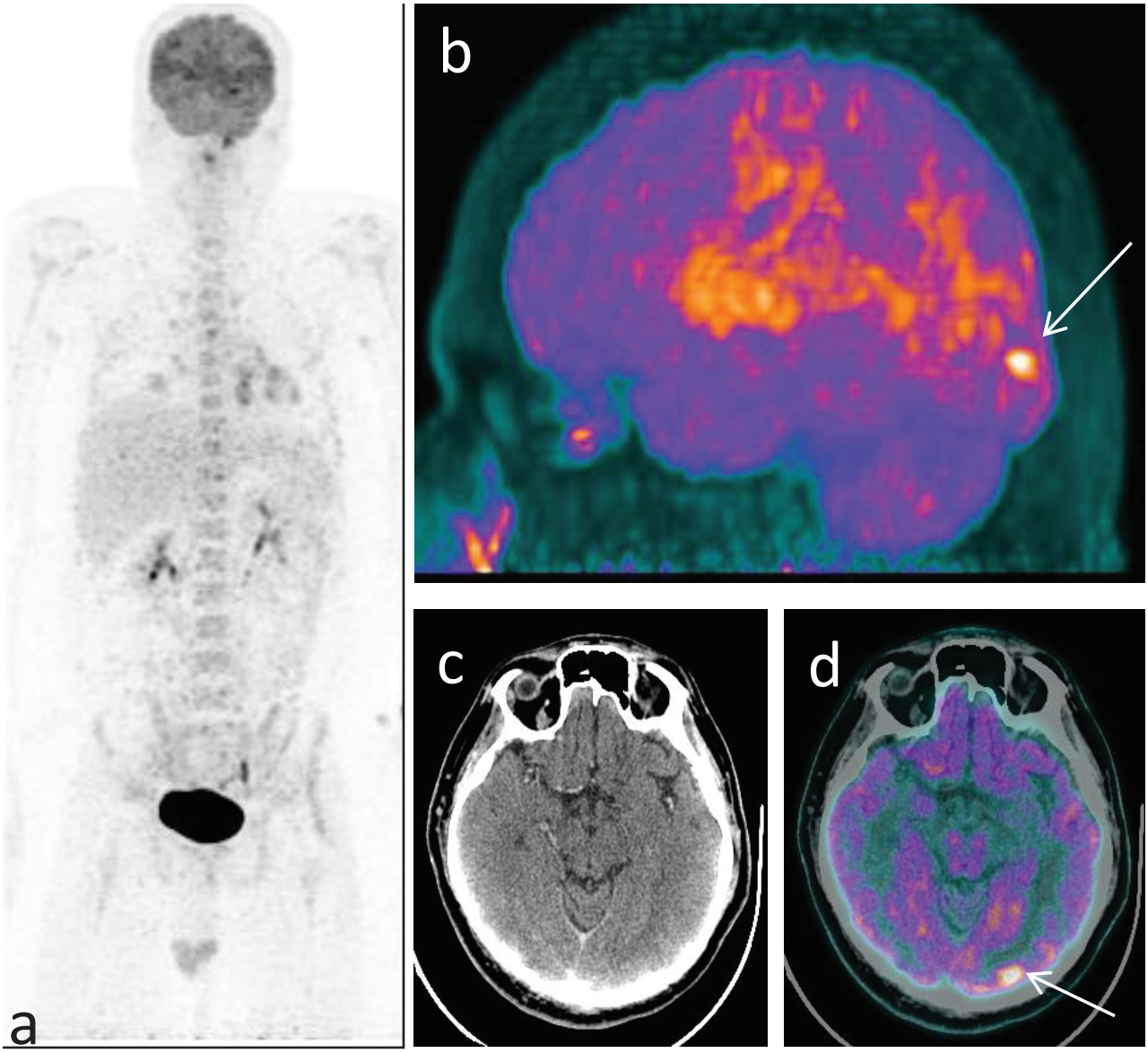

Figure 2. *Shows 18F-FDG PET CT whole body maximum intensity projection (MIP) (a), brain PET MIP (b), brain CT (c) and fused axial brain PET CT section (d), showing abnormal focal increased tracer uptake in left occipital region (white arrow).*

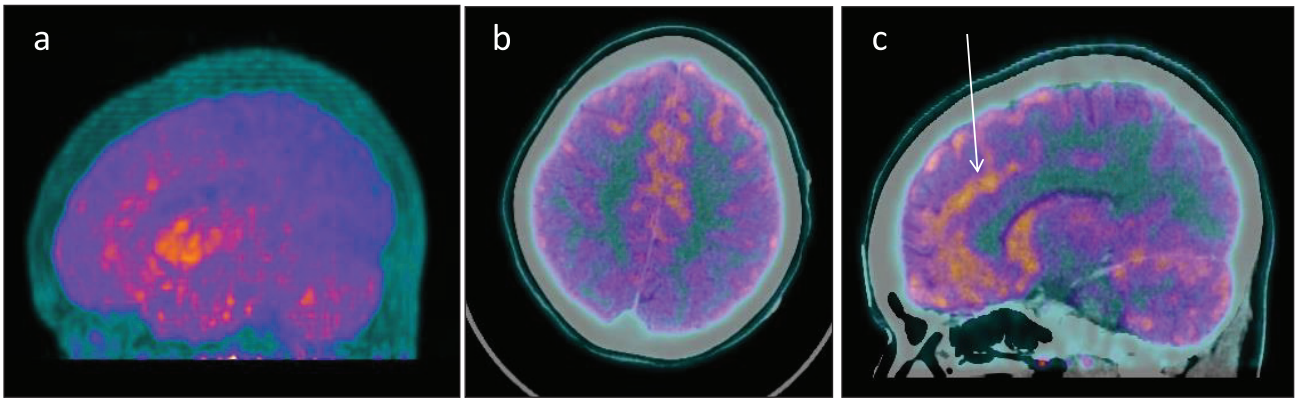

Figure 3. *Shows 18F-FDG BRAIN PET CT MIP (a), Axial (b) and sagittal (c) section of fused PET/CT showing diffusely reduced FDG uptake in bilateral parieto-occipital regions. Bilateral frontal and temporal lobes show preserved/relative increased FDG uptake compared to parieto-occipital region, more so in medial frontal/anterior cingulate region (white arrow).*

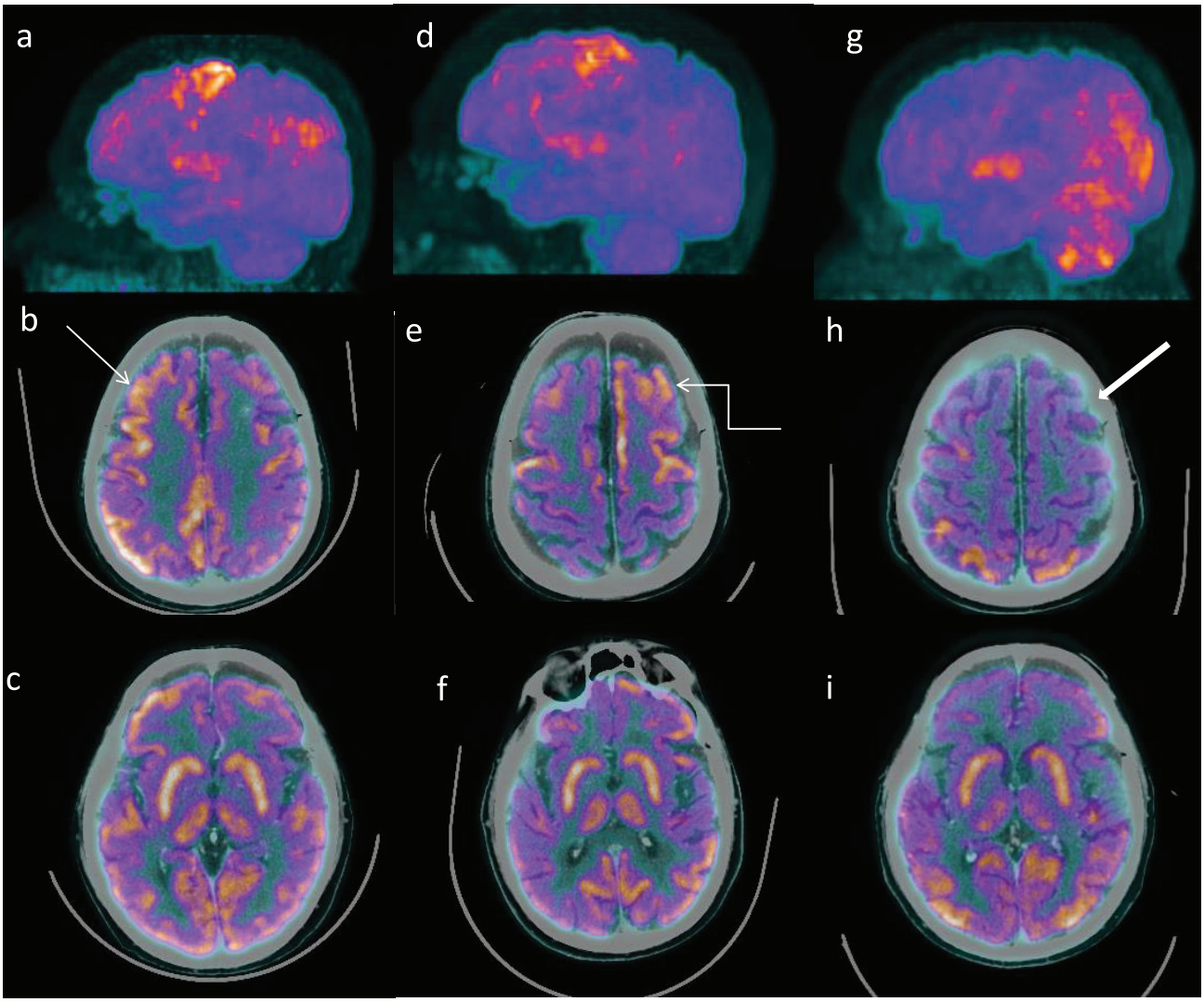

Figure 4. *Shows MIP and fused axial PET/CT images of three sequential FDG PET CT done on 22/7/22, 16/3/24 and 10/4/24 in a 77-year-old patient presenting with recurrent complex partial seizure. PET CT done on 22nd July 22 (a-c) showed heterogeneous increased metabolic uptake in right fronto-parietal cortex (white arrow), left high frontal cortex (not shown in image). Follow up PET/CT done on 16/3/24 (d-f) showed (curved arrow), mildly in right frontal lobe. Follow up PET/CT done on 10/4/24 (g-i) showed resolution of previously seen heterogeneously increased FDG uptake in bilateral frontal lobes. Bilateral frontal and temporal lobes show reduced FDG uptake (thick white arrow) relative to heterogeneously increased FDG uptake in bilateral parieto-occipital cortices and heterogeneously increased FDG uptake noted in left frontal lobe cerebellum.*

were found to be better for diagnosing and understanding disease etiology and activity.

Case vignette 1 Table 1.1

A 20-year-old healthy female of Asian ethnicity, presented to the emergency department (ED) with altered sensorium, a history of intermittent episodic abnormal movements, and fever with headaches, for 2 days. In inter ictal phase, she was drowsy with incoherent speech. Neurological examination showed no meningeal signs. Routine blood tests and neuroimaging (brain MRI) were normal. The EEG was suggestive of delta theta rhythm predominant in the left hemisphere. With a history of fever and seizures, a provisional diagnosis of infective meningoencephalitis was made, and was started on ceftriaxone, acyclovir, and levetiracetam with other supportive medications. CSF analysis revealed HHV 6 positive, cell count of 5 cells/mm^3 with lymphocytic predominance. Ganciclovir was administered to treat viral encephalitis. She continued to seize and slowly escalated to multiple anti-seizure medication (ASM), which included levetiracetam, lacosamide, clobazam, and perampanel. Serum and CSF for AIE panel and anti-neuronal antibody in serum were negative. The semiology of her seizure changed from focal seizures to myoclonic jerks in lower limbs and pelvic thrusting with post ictal loss of consciousness lasting a few seconds. The frequency, which was 5-6 seizures for the first 3 days, reduced to nocturnal myoclonic jerks on 15 minutes into sleep (stage 1 of NREM). She had visual hallucinations and started enacting her dreams during sleep. In view of behavioral disturbances, perampanel was cross tapered with sodium valproate. Brain MRI was normal, while FDG PET brain showed hypermetabolism in the anterior cingulate gyrus. A repeat EEG showed slow background activity with no epileptiform discharges. Seven days post anti-viral therapy, she was still on multiple ASM. The possibility of seronegative AIE was kept, and intravenous immunoglobulin (IVIG, 2 gm/kg body weight) was started. Her seizure activity was reduced, EEG was not showing epileptiform discharges, was started on Brivaracetam, Oxcarbazepine, Clobazam, perampanel, and phenytoin and was discharged. She returned to the ED 3 weeks after discharge with myoclonic jerks and psychological issues, and parasomnia (aggressive behavior, dissociation disorder, and somnambulism). Third EEG showed spike and wave in left frontal area spreading to the occipital lobe. Second FDG PET revealed hypometabolism in the anterior cingulate gyrus, which initially showed increased FDG uptake. Psychiatry referral was taken in view of behavioral changes and was started on Etizolam, Desvenlaflexane, and flupentixol. The patient was planned for the second cycle of IVIG. During admission, she experienced two episodes of sleepwalking. Polysomnography revealed left fronto central slowing with epileptiform discharges. Whole exome sequencing showed no pathological mutation. She was started on Injection Rituximab. She is still on three ASM and waiting for immunosuppression to be effective for optimizing her ASM.

Case vignette 2 Table 1.2

A 26-year-old healthy male presented in ED with recurrent episodes of focal seizures with generalized tonic clonic seizure. The patient had a history of low-grade intermittent fever for 10 days. A provisional diagnosis of infective meningoencephalitis was made. He was started on broad-spectrum antibiotics, acyclovir, Levetiracetam, and Lacosamide, which controlled his generalized seizure for 48 hours, but focal seizures with or without loss of consciousness persisted. Blood investigations were normal and brain MRI contrast did not show signal changes. CSF analysis (cells, proteins, infection panel, autoimmune, and neuronal panel) was normal. EEG showing continuous spike and wave discharges from the frontoparietal temporal area of the left hemisphere. After excluding other possibilities (infection), the patient was diagnosed as seronegative AIE. On day 2 of admission, he was started on intravenous methylprednisolone and IVIG.

On day 3 of admission, the patient had status epilepticus despite multiple ASM's and was started on Midazolam infusion. Seizures persisted clinically, after which he was put on anesthetic agents (thiopentone infusion). The patient continued to seize. On day 6, he was scheduled for plasma exchange (PLEX) in view of non-responsiveness to the multiple ASM and anesthetic agents, failing to control the seizure activity both clinically and electro physiologically. On day 8th, Ketamine infusion was initiated after failed attempt to achieve burst suppression. Seizures were controlled clinically. FDG PET brain scan was done after his condition stabilized, which revealed hypermetabolism in the left occipital lobe and reduced uptake in the frontoparietal cortex. After burst suppression was achieved, Tocilizumab 400 mg was administered. He was gradually weaned off and discharged 1 month later on Phenobarbitone, Clobazam, Brivaracetam, Sodium Valproate, Lacosamide, Parempanel, Cannabidiol, and Omnacortil. The patient continued to have facial myokymia in the perioral area. He was eventually lost to follow up.

Case vignette 3 Table 1.3

A 37-year-old female came to ED with abnormal movements, altered sensorium, and vomiting for 5 days, with low-grade fever persisting for 10 days. On examination, she was disoriented, drowsy, did not respond to commands, and showed no signs of meningeal irritation. A provisional diagnosis of viral meningoencephalitis was kept, and hence started on broad spectrum antibiotics and acyclovir. She continued to seize, midazolam infusion, and was put on ventilatory support. Brain MRI contrast was normal.

EEG showed generalized epileptiform discharges with slow background activity. She was started on propofol followed by thiopentone infusion. Burst suppression was achieved after 48 hours. Extensive blood work up (hemogram, liver and kidney functions, vasculitis profile, ACE, thyroid functions, viral markers, VDRL) and CSF analysis (cells, proteins, glucose, culture, India ink, GeneXpert, cryptococcal antigen, AIE panel) were non-contributory. The seizure activity was controlled by ketamine infusion. She was diagnosed as seronegative AIE and administered immunomodulatory therapy, (IVMPS and IVIG), for 5 days. After 20 days, the seizure activity was electro physiologically controlled. The patient was discharged after 21 days on oral steroids, azathioprine, barbiturates, levetiracetam, lacosamide, clobazam, and sodium valproate.

Case vignette 4 Table 1.4

A 78-year-old male was admitted after one episode of seizure at his home. He is a known case of type 2 diabetes mellitus, hypertension, post CABG (4 years back). In ED, he was conscious, oriented to time place and person, following verbal commands, no sensory or motor deficits. There was no history of fever or altered sensorium, trauma. EEG did not show any epileptiform discharges. He was given loading dose of levetiracetam, after which was kept on a maintenance dose. Brain MRI did not show signal changes. Routine blood investigations were normal. He was admitted to the ward for further management. In the ward, he had an episode of motor aphasia with vacant stare, lasting few seconds. His ASM were upgraded, and lacosamide was added. On day 3 in the hospital, the patient had another episode of motor aphasia with a vacant stare for 4-5 seconds. After this, he was started on triple therapy of ASM, Phenytoin was added along with Levetiracetam and Lacosamide. The patient continued to have similar episodes lasting few seconds, which increased in frequency each day. His whole-body PET CT was done, which showed increased metabolic activity in right fronto parieto occipital region and left basal ganglia.

He was further investigated in view of not responding to the multiple ASM. His anti neuronal antibody and AIE panel were negative. Lumbar puncture was done to rule our infective etiology, which was acellular with normal proteins. Immunomodulatory therapy, IVIG, was given, after which the patient responded well. Repeat EEG, MRI brain showed no epileptiform discharges or structural pathology, or changes. The patient responded well to IVIG, and the seizures were well controlled, the diagnosis of seronegative AIE was hence kept. After three maintenance doses (1 gm/kg body weight), the treatment was escalated to immunosuppression, Inj Rituximab was administered. After one and a half years of the first dose of Inj Rituximab, (during this he had two doses of Rituximab) patient came again, with similar seizure manifestation. He was due for the third dose of Inj Rituximab. He was given IVIG as bridging therapy prior to Inj Rituximab, with which he responded well.

Discussion

The presence of autoantibodies against cell surface or intracellular antigens provides an affirmative diagnosis of AIE. Cell-based assays with immunofluorescence are considered the most sensitive and specific technique for detecting autoantibodies. However, the dilemma in patients with the absence of autoantibodies (due to unknown antibodies, false negative results, poor sensitivity of assays, wrong methods, or technical error) causes treatment delays, morbidity, or, in worst cases, mortality [4].

Graus and Dalmau [11] in 2017 published the diagnostic criteria for AIE based on possible and probable criteria. The diagnosis of possible seronegative AIE requires the presence of focal neurological deficits, new onset seizures, CSF pleocytosis, brain MRI consistent with AIE (T2 hyperintensity in one or both medial temporal lobes or multifocal hyperintensities appearing consistent with inflammation/demyelination in the white matter, gray matter, or both). Probable seronegative AIE requires the presence of at least two of three of the following: brain MRI consistent with AIE; brain biopsy showing inflammation (and excluding another pathology); and CSF abnormality including pleocytosis, elevated IgG index, or CSF-specific oligoclonal bands [3,5].

The sensitivity of FDG PET over the brain MRI was duly studied with time, especially in cases with seronegative AIE, where the diagnostic dilemma persisted. In due course of time, the patterns in FDG PET were defined and correlated with autoantibodies. Mesial temporal lobe hypermetabolism has been described in both NMDAR and anti-leucine-rich-glioma-inactivated-1 (LGI1) AIE. Hypometabolism in the cingulate, medial and mid-frontal, and parietotemporal cortices in LGI1 AIE and hypermetabolism in the basal ganglia, cerebellum, and brain stem, areas hypothesized to be associated with the Facio brachial dystonic movements associated with LGI1 AIE [6-9]. Dysmetabolism in FDG-PET/CT has not been previously characterized inpatients with seronegative AIE. The areas of hypermetabolism, as per the literature, were basal ganglia, hippocampus, amygdala and cerebellum, while hypometabolism was reported in visual cortex. Patients presenting with varied clinical symptoms may be presenting at different stages of the disease, and hence the various patterns of brain metabolism. However, the reasons for not including FDG PET in the diagnostic criteria could have been difficulty accessing the PET facility in remote areas, ease of availability of utilizing MRI, or financial burden on the patient [10,11].

In this case series, we report four adults who presented with refractory seizures requiring multiple ASM, out of which two of them required anesthetic agents to control

the seizures, further avoiding any damage to the brain parenchyma. EEG showed background slowing, spike wave discharges from different loci with or without secondary generalization. Brain MRI could not reveal hyperintensities/signal changes that might have been given a clue for possible active inflammatory processes in the cortex. CSF analysis was also acellular with normal protein levels indicating an intact blood nerve barrier. However, FDG PET imaging gave us a clue of ongoing inflammation guiding for precise management in controlling the refractory seizure. Due to financial implications, FDF PET could not be done in the third case. In cases of young adults with NORSE or refractory seizure, where no other etiology is conclusive, chances of an immune-mediated phenomenon is certainly high, FDG PET can be recommended and can be taken into consideration.

Limitations

PET studies should be performed during "a resting state" (eyes open in a dark room with minimal disturbance or noise). Care should be taken to minimize head movement during scans. The ongoing medications and the behavioral state of patients at the time of the scan should be taken into consideration. Multicentric studies with a large number of patients are, however, required to assess the generalizability of our recommendations.

Conclusion

The limited resources and sensitivity of antibody testing makes diagnosis of AIE challenging. There is a dearth of knowledge due to unexplored antibodies, and sensitive biomarkers, or definitive neuroimaging for its diagnosis. This uncertainty adds to the strategizing treatment, which is a challenge, especially in seronegative AIE. MRI brain in many cases can be inconclusive, FDG-PET/CT, to the diagnostic evaluation of a patient with suspected AIE has the potential to expedite diagnosis, minimise the possibility of missing a treatable disease, initiating early treatment, prognosticating with minimal evasion, leading to better clinical outcomes for patients.

What is new?

The manuscript includes four patients who have been diagnosed with seronegative AIE. The patient's condition was critical when they were admitted to the hospital. The brain MRI did not provide a definitive diagnosis. However, three out of four patients who had FDG PET showed increased metabolic uptake, which provided a clue for seronegative AIE. This gave clinicians a possibility of an ongoing inflammatory process and further treatment regimens, immunomodulation.

List of Abbreviations

AIE	Autoimmune encephalitis
ASM	Anti-seizure medication
CABG	Coronary Arterial bypass grafting
CSF	Cerebrospinal Fluid
CT	Computed tomography
EEG	Electroencephalogram
FDG	Fluro deoxy glucose
IVMPS	Intravenous methylprednisolone
IVIG	Intravenous immunoglobulin
MRI	Magnetic resonant Imaging
NORSE	New onset refractory status epilepticus
PET	Positron emission tomography
VDRL	Venereal Disease Research Laboratory

Conflict of interest

The author(s) declare that they have no conflict of interest regarding the publication of this manuscript.

Funding

None.

Consent for publication

Due permission was obtained from the patient/parents/guardians of the patient to publish the case and the accompanying images.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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References

1. Vogrig A, Gigli GL, Nilo A, Pauletto G, Valente M. Seizures, epilepsy, and NORSE secondary to autoimmune encephalitis: a practical guide for clinicians. Biomedicines. 2022;11(1):44. https://doi.org/10.3390/biomedicines11010044
2. Costello DJ, Matthews E, Aurangzeb S, Doran E, Stack J, Wesselingh R, et al. Clinical outcomes among initial survivors of cryptogenic new-onset refractory status epilepsy (NORSE). Epilepsia. 2024;65(6):1581–8. https://doi.org/10.1111/epi.17950
3. Graus F, Titulaer MJ, Balu R, Benseler S, Bien CG, Cellucci T, et al. A clinical approach to diagnosis of autoimmune encephalitis. Lancet Neurol. 2016;15(4):391–404. https://doi.org/10.1016/S1474-4422(15)00401-9
4. Yeshokumar AK, Coughlin A, Fastman J, Psaila K, Harmon M, Randell T, et al. Seizures in autoimmune encephalitis-a systematic review and quantitative synthesis. Epilepsia. 2021;62(2):397–407. https://doi.org/10.1111/epi.16807
5. Solnes LB, Jones KM, Rowe SP, Pattanayak P, Nalluri A, Venkatesan A, et al. Diagnostic value of 18F-FDG PET/CT versus MRI in the setting of antibody-specific autoimmune encephalitis. J Nucl Med. 2017;58(8):1307–13. https://doi.org/10.2967/jnumed.116.184333
6. Sadaghiani MS, Roman S, Diaz-Arias LA, Habis R, Venkatesan A, Probasco JC, et al. Comparison of quantitative FDG-PET and MRI in anti-LGI1 autoimmune encephalitis. Neuroradiology. 2023;65(8):1225–38. https://doi.org/10.1007/s00234-023-03165-2

7. Lee WJ, Lee HS, Kim DY, Lee HS, Moon J, Park KI, et al. Seronegative autoimmune encephalitis: clinical characteristics and factors associated with outcomes. Brain. 2022;145(10):3509–21. https://doi.org/10.1093/brain/awac166
8. Baldissin MM, de Souza EM, Watanabe N, Etchebehere EC, Cendes F, Amorim BJ. FDG-PET in patients with autoimmune encephalitis: a review of findings and new perspectives. Clin Transl Imaging. 2024;12(1):15–30. https://doi.org/10.1007/s40336-023-00581-5
9. Roman SN, Sadaghiani MS, Diaz-Arias LA, Le Marechal M, Venkatesan A, Solnes LB, et al. Quantitative brain 18F-FDG PET/CT analysis in seronegative autoimmune encephalitis. Ann Clin Transl Neurol. 2024;11(5):1211–23. https://doi.org/10.1002/acn3.52035
10. Morbelli S, Zoccarato M, Bauckneht M, Anglani M, Cecchin D. 18 F-FDG-PET and MRI in autoimmune encephalitis: a systematic review of brain findings. Clin Transl Imaging. 2018;6(3):151–68. https://doi.org/10.1007/s40336-018-0275-x
11. Graus F, Dalmau J. Role of (18)F-FDG-PET imaging in the diagnosis of autoimmune encephalitis - Authors' reply. Lancet Neurol. 2016;15(10):1010. https://doi.org/10.1016/S1474-4422(16)30130-2

Summary of the case

This case series summarises the importance of doing FDG PET Brain as a surrogate marker for immunological brain dysfunction, especially when MRI brain and CSF analysis have been inconclusive. This suggests that in NORSE or unexplained refractory seizure, FDG PET brain can be considered to look for immune mediated aetiology.

1	Patient (gender, age)	As per the table
2	Final diagnosis	Seronegative Autoimmune encephalitis.
3	Symptoms	New onset refractory status epilepticus
4	Medications	Immunomodulatory therapy (IVIG and/or PLEX, steroid), immunosuppression, anti seizure medication
5	Clinical procedure	MRI brain, FDG PET brain, EEG
6	Specialty	Neurology, Immunology, Epileptology, Critical Care