Clinical and Neuroimaging predictors of Seizures in SSPE Patients

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Introduction:

❖ SSPE background: Progressive, fatal measles-related neurodegenerative disorder; while myoclonus is classical, seizures (10–40%) are an important comorbidity influencing prognosis and management.

❖ Predictors explored in literature: Younger age at onset, advanced disease stage, atypical EEG features, cortical/subcortical MRI abnormalities; CSF and antibody markers less consistent.

❖ Rationale for study: Identifying seizure predictors can aid prognostication, guide antiepileptic therapy, and improve counseling and management strategies in SSPE.

Aims:

❖ To study the seizure semiology & its clinical and neuroimaging predictors in patients with Subacute Sclerosing Panencephalitis

Materials and Methods:

❖ **Design & Setting:** Prospective observational study (June 2023 – Dec 2024) at KGMU Neurology, with ethical approval; 44 SSPE patients enrolled using purposive sampling and informed consent.

❖ **Assessments:** Clinical evaluation, Jabbour's staging, NDI, MRS, video EEG (30-min), MRI (T1, T2, FLAIR, DWI, contrast), and video analysis of seizures/myoclonus.

❖ **Treatment:** Intrathecal Interferon Alfa ± oral Isoprinosine administered weekly and monthly for 6 months as per protocol.

❖ **Follow-up:** Patients monitored for 6 months for seizures, with repeated clinical, lab, EEG, and imaging assessments.

❖ **Statistical Analysis:** Data analyzed using SPSS v24; descriptive stats, chi-square/Fisher's exact, Mann–Whitney U, logistic regression; $p < 0.05$ considered significant.

Results

MRI Parameters		Seizure		P value	OR(95%CI)
		Absent	Present		
MRI Status (n=43)	Normal	7 (24.1%)	0 (0.0%)	0.102	1.64 (1.26-2.12)
	Abnormal	22 (75.9%)	14 (100.0%)		
Cortical Signal Changes	Absent	27 (90.0%)	1 (7.1%)	.001	175.5(14.55-2116.69)
	Present	2 (6.7%)	13 (92.9%)		
Temporal WM Changes	Absent	25 (83.3%)	8 (57.1%)	.082	4.68(1.05- 20.89)
	Present	4 (13.3%)	6 (42.9%)		
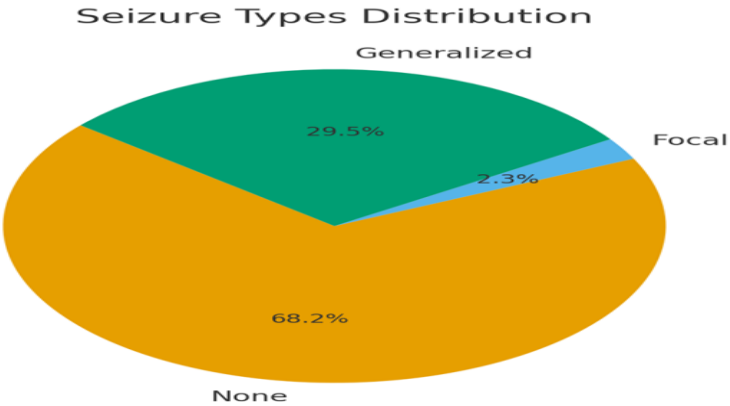
Parameters		Seizure		P Value	OR (95%CI)
		Absent	Present		
Myoclonus and Cognitive Decline (n=44)	Myoclonus only	2 (6.7%)	1 (7.1%)	.693	0.93(0 .08-11.19)
	Myoclonus + Cognitive Decline	28 (93.3%)	13 (92.9%)		
Visual Impairment	Absent	29 (96.7%)	14 (100.0%)	.490	0.67 (0 .55-0 .83)
	Present	1 (3.3%)	0 (0.0%)		
Behaviour	Normal	12 (40.0%)	2 (14.3%)	.163	4.00 (0 .75- 21.15)
	Abnormal	18 (60.0%)	12 (85.7%)		
Duration of Disease	0–6 months	24 (80.0%)	10 (71.4%)	.701	1.6 (0 .37- 6.92)
	7–12 months	6 (20.0%)	4 (28.6%)		
Myoclonus types	Focal	2 (6.7%)	0 (0.0%)	.298	
	Multifocal	7 (23.3%)	6 (42.9%)		
	Segmental	3 (10.0%)	3 (21.4%)		
	Generalized	18 (60.0%)	5 (35.7%)		
Stage of Disease	2	18 (60.0%)	5 (35.7%)	.112	
	3	8 (26.7%)	3 (21.4%)		
	4	4 (13.3%)	6 (42.9%)		
NDI at Admission (n=44)	<25 Mild	2 (6.7%)	0 (0.0%)	.274	
	25–50 Moderate	15 (50.0%)	4 (28.6%)		
	51–75 Severe	12 (40.0%)	10 (71.4%)		
	>75 Profound	1 (3.3%)	0 (0.0%)		

Seizure Types Distribution

- Generalized 29.5%
- Focal 2.3%
- None 68.2%

Results

EEG Parameters		Seizure		P Value	OR(95%CI)
		Absent	Present		
Background (n=44)	Diffuse slowing	22 (73.3%)	12 (85.7%)	.462	0.45(0.08 - 2.51)
	PDR	8 (26.7%)	2 (14.3%)		
Discharge Type	No sharp waves	19 (63.3%)	1 (7.1%)	.005	
	Focal sharp waves	4 (13.3%)	3 (21.4%)		
	Multifocal sharp waves	2 (6.7%)	3 (21.4%)		
	Generalized sharp & waves	5 (16.7%)	5 (35.7%)		
	Generalized spikes & waves	0 (0.0%)	2 (14.3%)		

Conclusion

- A **significant association** was found between **cortical signal changes and seizures** (92.9% in seizure group vs. 6.7% in non-seizure group; p=0.001), establishing **cortical involvement as a strong radiological predictor of seizures.**

- **Temporal lobe white matter changes** were more common in seizure patients and approached statistical significance (p = 0.082), suggesting a **possible role of temporal structures in seizure generation.**

- **Epileptiform discharges on EEG** like generalized sharp waves, multifocal sharp waves, and spike-and-wave discharges were **significantly more frequent in patients with seizures.** The presence of **epileptiform discharges** was **significantly associated with seizure occurrence (p = 0.005)**, highlighting the **diagnostic and prognostic value of EEG** in SSPE.