



CLINICAL PROFILE AND SHORT-TERM OUTCOMES OF NEW ONSET SEIZURE IN ADULTS: A PROSPECTIVE OBSERVATIONAL STUDY FROM A TERTIARY CARE HOSPITAL IN GUJARAT, INDIA

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ABSTRACT

New onset seizure in adults is a common neurological emergency with a broad etiological spectrum. We prospectively enrolled 50 consecutive adults (≥ 15 years) admitted with new onset seizure to a tertiary care teaching hospital in Gujarat between January 2022 and December 2023. Mean age was 37.34 ± 11.48 years; 68.0% were male. Generalized tonic-clonic seizure predominated (94.0%). Idiopathic GTCS was the largest etiologic category (48.0%), followed by alcohol withdrawal (10.0%), hyponatremia (6.0%), and focal structural seizure (6.0%); metabolic, infective, and structural causes together accounted for 34.0%. Electroencephalography showed epileptiform discharges in 38.0%, significantly associated with focal seizure type (Fisher exact $p=0.036$; RR 3.92, 95% CI 2.34–6.57). Mean duration of stay was 4.66 ± 1.47 days and differed significantly across etiologic categories (ANOVA $F=4.18$, $p=0.021$). Overall cure rate was 94.0% with 6.0% in-hospital mortality, all deaths occurring in patients with severe structural or multisystem pathology. Underlying etiology, rather than seizure semiology, was the principal determinant of short-term outcome.

KEYWORDS : New Onset Seizure, Generalized Tonic-Clonic, Etiology, Electroencephalography, India

INTRODUCTION

New onset seizure — a first-ever clinical seizure without previously diagnosed epilepsy — accounts for approximately 1–2% of adult emergency visits and may reflect either an isolated self-limited event, the first manifestation of chronic epilepsy, or a sentinel feature of a serious underlying disorder (Krumholz et al., 2015). Nearly 80% of the global epilepsy burden is borne by low- and middle-income countries (Singh & Sander, 2020), yet contemporary hospital-based data from semi-urban Indian tertiary care settings remain limited. The present study therefore characterizes the clinical, laboratory, radiological, electroencephalographic, and management profile and short-term outcomes of adults presenting with new onset seizure at a tertiary care teaching hospital in Gujarat.

MATERIALS AND METHODS

A hospital-based prospective observational study was conducted over 24 months (January 2022 – December 2023) at a tertiary care teaching hospital in Gujarat. All consecutive adults (≥ 15 years) admitted with a first-ever clinical seizure were screened; patients with prior seizure disorder, febrile convulsions, eclampsia, or incomplete records were excluded. Sample size ($n=50$) was calculated using $n=Z^2pq/d^2$ with $Z=1.96$, $p=0.70$, and $d=0.13$. The study was approved by the Institutional Ethics Committee and written informed consent was obtained from every participant. Seizures were classified per the 2017 ILAE operational classification. All patients underwent a baseline biochemical panel, neuroimaging (CT with MRI where indicated), and standard 30-minute inter-ictal electroencephalography. Data were analyzed with SPSS 25.0; continuous variables as mean $\pm$ SD, categorical as n (%). Associations were tested with chi-square or Fisher's exact test; continuous comparisons used independent-samples t -test or one-way ANOVA with Bonferroni correction, and Pearson's correlation for linear associations. Two-tailed $p<0.05$ was considered significant.

RESULTS

Fifty consecutive patients were enrolled. Mean age was 37.34 ± 11.48 years, with 80.0% in the productive 21–50 year band; 34 (68.0%) were male (M:F 2.13:1). Generalized tonic-clonic

seizure predominated (94.0%, $n=47$), with focal seizures in 6.0% ($n=3$). Twenty-eight patients (56.0%) were conscious and oriented at admission, while 12 (24.0%) were disoriented, 8 (16.0%) were post-ictal, and 2 (4.0%) unconscious. Tongue bite was documented in 84.0% and neck rigidity in 22.0% (Table 1).

Idiopathic GTCS was the single largest etiologic category (48.0%, $n=24$), followed by alcohol withdrawal seizure (10.0%), hyponatremia-induced seizure (6.0%), and focal structural seizure (6.0%); collectively, metabolic causes accounted for 16.0%, central nervous system infections for 8.0%, and structural lesions for 10.0% (Table 1). Neuroimaging was normal in 32 patients (64.0%). Abnormal findings included meningitis with cerebral edema (8.0%), temporal or mesial temporal sclerosis (6.0%), space-occupying lesion (4.0%), intraparenchymal hemorrhage (4.0%), and metabolic encephalopathy (4.0%); temporal sclerosis was identified exclusively on magnetic resonance imaging.

Electroencephalography demonstrated epileptiform discharges in 19 patients (38.0%). The association between EEG positivity and seizure type was statistically significant (Table 2): discharges were present in 100.0% of focal seizure patients (3/3) versus 34.0% of GTCS patients (16/47; Fisher exact $p=0.036$), yielding a relative risk of 3.92 (95% CI 2.34–6.57). Anti-epileptic drug monotherapy was administered in 32 patients (64.0%), benzodiazepine alone for acute control in 8.0%, and etiology-specific combinations in the remaining 36.0%, including anti-epileptic drug with antihypertensive, 3% hypertonic saline, antibiotics, antivirals, dialysis, dextrose, or anti-tubercular therapy as indicated. Levetiracetam was the preferred first-line anti-epileptic drug.

Mean duration of stay was 4.66 ± 1.47 days (range 3–10) and differed significantly across etiologic categories (Figure 1; $F=4.18$, $df=2$, $p=0.021$): idiopathic GTCS 4.21 ± 0.83 days, metabolic/toxic 4.81 ± 1.28 days, and structural/infectious 5.90 ± 2.42 days; post-hoc Bonferroni confirmed the structural/infectious versus idiopathic GTCS difference ($p=0.018$). Pearson correlation showed age ($r=+0.32$,

$p=0.023$), serum sodium ($r=-0.28$, $p=0.048$), and blood urea ($r=+0.41$, $p=0.003$) as significant correlates with duration of stay. The overall cure rate was 94.0% ($n=47$), with in-hospital mortality of 6.0% ($n=3$). All three deaths occurred in patients with severe structural or multisystem pathology (intraparenchymal hemorrhage with herniation, tuberculous meningitis with refractory raised intracranial pressure, and hepatic encephalopathy with multi-organ failure); mortality within the idiopathic GTCS subgroup was zero.

Table – 1 Demographic, Clinical, and Etiologic Profile of the Study Cohort (N = 50)

Variable	Frequency (n)	Percentage (%)
Age group (years); mean 37.34 ± 11.48		
<20	4	8.0%
21–30	11	22.0%
31–40	15	30.0%
41–50	14	28.0%
51–60	5	10.0%
>60	1	2.0%
Sex (M:F 2.13:1)		
Male	34	68.0%
Female	16	32.0%
Seizure type		
Generalized tonic-clonic	47	94.0%
Focal	3	6.0%
Orientation at admission		
Conscious and oriented	28	56.0%
Disoriented	12	24.0%
Post-ictal state	8	16.0%
Unconscious	2	4.0%
Clinical features (present)		
Tongue bite	42	84.0%
Uprolling of eyeballs	28	56.0%
Neck rigidity	11	22.0%
Extensor plantar response	6	12.0%
Etiology		
Idiopathic GTCS	24	48.0%
Alcohol withdrawal	5	10.0%
Focal structural	3	6.0%
Hyponatremia-induced	3	6.0%
Space-occupying lesion	2	4.0%
Intraparenchymal hemorrhage	2	4.0%
Bacterial meningitis	2	4.0%
Other causes (1 each)*	9	18.0%
Short-term outcome		
Discharged (cured)	47	94.0%
In-hospital mortality	3	6.0%

*Other causes (1 each): uremic seizure, hypoglycemic seizure, hepatic encephalopathy, cerebrovascular accident, tuberculous meningitis, posterior reversible encephalopathy syndrome, viral meningitis, hypertensive encephalopathy, and metabolic encephalopathy. Stretching of limbs was present in 100.0% of patients.

Table – 2 Electroencephalography Findings by Seizure Type (N = 50)

EEG finding	GTCS (n = 47)	Focal (n = 3)	Total (N = 50)
Positive (epileptiform discharges)	16 (34.0%)	3 (100.0%)	19 (38.0%)
Negative (normal)	31 (66.0%)	0 (0.0%)	31 (62.0%)

Fisher exact $p = 0.036$ (significant). Relative risk (focal vs GTCS) 3.92 (95% CI 2.34–6.57).

EEG: electroencephalography. GTCS: generalized tonic-clonic seizure. CI: confidence interval. Fisher's exact test used because of expected cell counts below five.

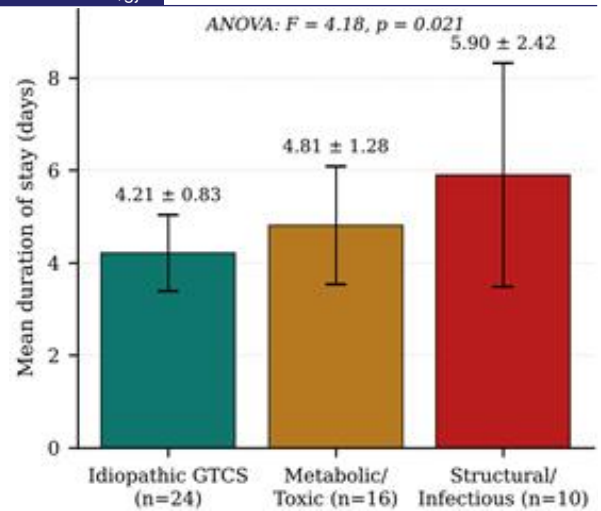


Figure 1: Mean duration of hospital stay by etiologic category. Error bars represent one standard deviation. One-way ANOVA $F = 4.18$, $p = 0.021$; post-hoc Bonferroni confirmed the structural/infectious versus idiopathic GTCS difference as significant ($p = 0.018$).

DISCUSSION

This prospective study of 50 adults with new onset seizure in Gujarat demonstrates a predominantly male, working-age cohort with marked generalized tonic-clonic preponderance; an etiologic spectrum dominated by idiopathic GTCS but with a clinically consequential minority of structural, metabolic, and infective causes; and a favorable short-term outcome in which mortality was confined to patients with severe structural or multisystem pathology.

The mean age (37.34 years) and male preponderance (68.0%) are consistent with hospital-based Indian cohorts (Puri et al., 2011; Sridharan & Murthy, 1999). The 94.0% share of generalized tonic-clonic semiology exceeds the 60–72% range reported from other Indian series (Kothari et al., 2010), probably reflecting a tertiary care referral filter and possible misclassification of focal-onset bilateral tonic-clonic seizures as primary generalized events in the absence of video-EEG monitoring. Idiopathic GTCS at 48.0% is slightly higher than the 35–42% reported elsewhere (Sridharan & Murthy, 1999), likely reflecting limited availability of advanced neuroimaging. The 8.0% contribution of central nervous system infection is higher than Western figures, consistent with the continuing Indian burden of bacterial and tuberculous meningitis (Banerjee et al., 2010).

The significant association between EEG positivity and focal seizure type (100.0% vs 34.0%; $p=0.036$) reinforces the role of EEG in distinguishing focal from generalized epilepsy syndromes; sleep-deprived or video-EEG would raise diagnostic yield in the idiopathic subgroup (Baldin et al., 2014). Levetiracetam, our preferred first-line anti-epileptic drug, is supported by the SANAD trial (Marson et al., 2007). Long-term anti-epileptic drug therapy was not initiated in clearly provoked seizures once the underlying cause was corrected, consistent with current guidelines (Krumholz et al., 2015). The 94.0% cure rate and zero mortality within the idiopathic subgroup, together with the aetiology-dependent gradient in duration of stay ($F=4.18$, $p=0.021$) and the strong positive correlation of blood urea with length of stay ($r=+0.41$, $p=0.003$), corroborate the clinical intuition that outcome is driven primarily by the underlying etiology rather than by the seizure semiology.

Limitations

The sample size of 50 limits statistical power for subgroup analysis and the single-center setting constrains external

validity. Long-term follow-up was not undertaken, EEG was limited to a single 30-minute awake recording, and advanced neuroimaging was not available.

CONCLUSION

New onset seizure in semi-urban Gujarat is predominantly a young-adult male entity with generalized tonic-clonic semiology and idiopathic etiology, carrying a favorable short-term prognosis (94.0% cure rate) when promptly managed. Underlying etiology, rather than seizure semiology, is the principal determinant of short-term outcome, supporting a protocol-driven first-contact evaluation and a measured approach to long-term anti-epileptic drug therapy once a reversible precipitant has been corrected.

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Conflict of Interest: None Declared.

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