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CLINICAL PROFILE, ETIOLOGY AND OUTCOMES OF ADULT-ONSET SEIZURES IN A RURAL TERTIARY CARE CENTRE

General Medicine

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ABSTRACT

Adult-onset seizures present with a diverse clinical and etiological spectrum, yet data from rural tertiary care settings in south India remain limited. This prospective observational study enrolled 50 adult patients (≥18 years) presenting with new-onset seizures or status epilepticus at Kamineni Institute of Medical Sciences, Narketpally, Telangana, from January 2024 to December 2025. Patients with psychogenic seizures and eclampsia were excluded. The etiological spectrum included cerebrovascular disease (32%), alcohol-related seizures (18%), metabolic abnormalities (16%), CNS infections (12%), and idiopathic causes (8%). Generalised tonic–clonic seizures (GTCS) were the predominant seizure type (88%). Hypertension was the most common comorbidity (50%), followed by diabetes mellitus (22%). EEG was performed in 54% and was abnormal in 11.1%; MRI identified structural lesions in 56% of imaged patients. At six-month follow-up, 66% achieved seizure relief, 30% had recurrence, and in-hospital mortality was 4%. These findings characterise the clinical profile, etiological spectrum, and short-term outcomes of adult-onset seizures in a rural Telangana cohort, underscoring the importance of systematic evaluation and early etiological diagnosis.

KEYWORDS

Adult-onset Seizures; Clinical Profile; Etiology; Outcomes; Rural Tertiary Care; Generalised Tonic-clonic Seizures

INTRODUCTION

Acute symptomatic seizures account for approximately 40% of all first seizures [1] and are defined by the ILAE as seizures occurring in close temporal proximity to an identifiable neurological or systemic insult. They are potentially reversible, and long-term antiepileptic therapy is often unnecessary once the precipitant is corrected [2,3]. In India, the etiological profile is shaped by high prevalences of hypertension, diabetes, and CNS infections including tuberculoma and neurocysticercosis, making rural Indian cohorts distinct from those in high-income settings [4,5].

Despite this, systematic data from rural tertiary care centres in south India remain sparse. This study aims to characterise the clinical profile, etiological spectrum, radiological findings, and short-term outcomes of adult-onset seizures at a rural tertiary care centre in Telangana.

METHODS

This was a prospective observational study at Kamineni Institute of Medical Sciences (KIMS), Narketpally, Telangana, from January 2024 to December 2025. Adults aged ≥18 years with new-onset seizures (focal or generalised) or status epilepticus were enrolled from casualty, OPD, and IPD. Patients with psychogenic seizures and eclampsia were excluded. Cerebrovascular events were classified by neuroimaging; metabolic abnormalities were defined on blood samples within 24 hours of the seizure (hypoglycaemia <60 mg/dL, hyperglycaemia >200 mg/dL, hyponatraemia <130 mmol/L). Sample size (n=50) was calculated using the Cochran formula assuming 50% prevalence of structural/infective aetiology [6], 95% confidence, and 14% precision. Descriptive statistics and Chi-square tests were used; analysis was performed on SPSS v25.0.

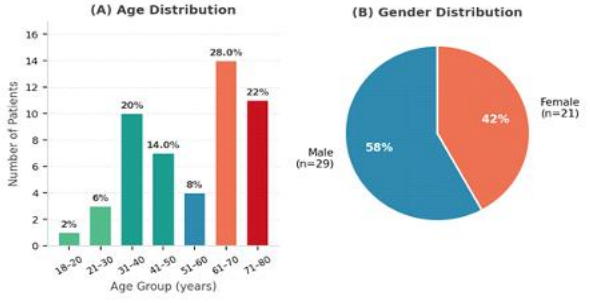

Figure 1: (A) Age distribution of patients showing peak incidence in the 61–70 years age group (28%). (B) Gender distribution showing male predominance (58% male vs. 42% female).

RESULTS

Demographics

Fifty adults were enrolled (29 males, 58%; 21 females, 42%). The age ranged from 18 to 80 years; the highest burden was in the 61–70 year group (n=14, 28%) followed by 71–80 years (n=11, 22%), with 50% of patients above 60 years (Figure 1).

Seizure Type

Generalised tonic–clonic seizures (GTCS) were overwhelmingly the most common seizure type, observed in 44 patients (88%; Figure 3B). Focal seizures occurred in 5 patients (10%), predominantly those with structural lesions including tuberculoma, neurocysticercosis, mesial temporal sclerosis, and tumour. Status epilepticus was observed in 1 patient (2%), who had underlying cerebrovascular disease.

Comorbidities

Hypertension was the most prevalent comorbidity (n=25, 50%), followed by diabetes mellitus (n=11, 22%), prior cerebrovascular accident (n=9, 18%), and coronary artery disease (n=3, 6%). Six patients had both diabetes and hypertension. Comorbidity categories are not mutually exclusive.

Etiological Spectrum

CVD was the leading etiology (n=16, 32%), followed by alcohol-related seizures (18%), metabolic abnormalities (16%), CNS infections (12%), and idiopathic causes (8%); cerebral amyloid angiopathy, mesial temporal sclerosis, and tumour each contributed ≤6% (Table 1). Ischaemic stroke predominated among CVD cases (75%); hypoglycaemia predominated among metabolic causes (62.5%); tuberculoma was the most common CNS infection (50%).

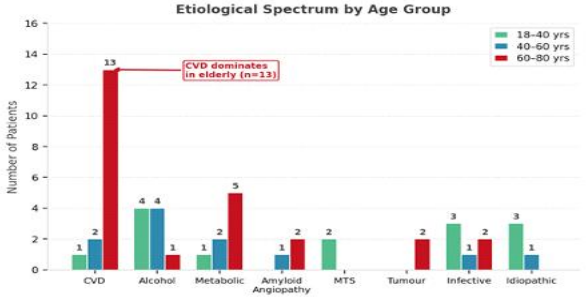

Figure 2: Etiological spectrum by age group. Cerebrovascular disease predominates in the 60–80 year group (n=13, 52%), while alcohol-related seizures peak in middle age (40–60 years). Infective and idiopathic causes are more common in younger adults (18–40 years).

TABLE – 1 ETIOLOGICAL SPECTRUM, SEIZURE TYPES, AND OUTCOMES (N=50)

Etiology	n	%	GTCS n(%)	Focal n(%)	SE n(%)	Outcome
Cerebrovascular Disease	16	32%	13 (81.3%)	2 (12.5%)	1 (6.3%)	9R/6Re/1E
Alcohol-related	9	18%	9 (100%)	0	0	5R/4Re
Metabolic Abnormality	8	16%	8 (100%)	0	0	7R/1Re
CNS Infection	6	12%	5 (83.3%)	1 (16.7%)	0	4R/1Re/1E
Cerebral Amyloid Angiopathy	3	6%	3 (100%)	0	0	2R/1Re
Mesial Temporal Sclerosis	2	4%	1 (50%)	1 (50%)	0	0R/2Re
Tumour (ICSOL)	2	4%	1 (50%)	1 (50%)	0	0R/2Re
Idiopathic	4	8%	4 (100%)	0	0	2R/2Re
Total	50	100 %	44 (88%)	5 (10%)	1 (2%)	33R/15Re/2E

R = Relieved; Re = Recurrent; E = Expired; SE = Status Epilepticus; ICSOL = Intracranial Space-Occupying Lesion. Comorbidity categories are not mutually exclusive.

Etiological Variation by Age Group

A striking age-dependent pattern was seen (Figure 2): CVD dominated in the 60–80 year group (52%), alcohol-related seizures peaked in 40–60 years (36.4%), mesial temporal sclerosis was confined to younger adults (18–40 years), and infective causes were most common in younger patients (21.4%). Metabolic abnormalities occurred across all age groups but were more frequent in the elderly (20%).

Investigations

EEG was performed in 27 patients (54%), with abnormal findings in 3 (11.1%). MRI was the most informative modality: ischaemic stroke in 12 (24%), haemorrhagic stroke in 4 (8%), tuberculoma in 3 (6%), ICSOL in 2 (4%), mesial temporal sclerosis in 2 (4%), microbleeds in 4 (8%), and normal findings in 16 (32%).

Outcomes

At six-month follow-up, 33 patients (66%) achieved seizure relief with appropriate etiological treatment and antiepileptic therapy (Figure 3A). Recurrent seizures were observed in 15 patients (30%), most frequently in those with cerebrovascular disease (n=6), alcohol-related causes (n=4), and mesial temporal sclerosis (n=2). In-hospital mortality was 4% (n=2): one patient with toxoplasmosis-related seizures and one with post-infarct encephalomalacia who presented in status epilepticus.

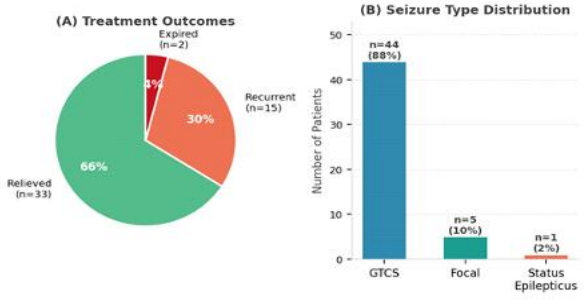

Figure 3: (A) Treatment outcomes at 6-month follow-up: 66% of patients achieved seizure relief, 30% experienced recurrence, and in-hospital mortality was 4%. (B) Seizure type distribution: generalised tonic–clonic seizures (GTCS) dominated across all aetiological groups (88%).

DISCUSSION

The clinical profile in this cohort — peak incidence in the 61–70 year group (28%), male predominance (58%), and GTCS as the dominant seizure type (88%) — is consistent with published series of adult-onset acute symptomatic seizures [7,8]. The higher mean age compared to earlier Indian studies [9,10] reflects the growing burden of cerebrovascular disease and vascular comorbidities in rural Telangana. Male preponderance aligns with published cohorts [11,12] and is attributable to greater alcohol consumption in younger males and higher vascular risk burden in elderly males [13].

Cerebrovascular disease (32%), predominantly ischaemic stroke (75% of CVD cases), was the leading etiology — particularly in patients above 60 years (52%). Cortical ischaemia elevates extracellular glutamate driving epileptiform discharges, while haemosiderin from haemorrhagic transformation acts as a direct epileptogen [14,15]. Alcohol-related seizures (18%), exclusively GTCS, were most common in the 40–60 year group, consistent with the brainstem-mediated NMDA-upregulation mechanism during withdrawal [16]. Hypoglycaemia (62.5% of metabolic cases) represents a fully reversible and routinely missed etiology, and CNS tuberculoma (50% of infective cases) reflects the ongoing regional burden of tuberculosis in younger patients [17].

Treatment outcomes were favourable in 66%, comparable to Sung et al. (62%) and Roberts et al. (65%) [18,19]. Recurrence (30%) was highest in CVD and mesial temporal sclerosis, underscoring the need for sustained antiepileptic therapy in structural aetiologies. Both in-hospital deaths were attributable to severe underlying pathology rather than seizures per se. The low EEG yield (11.1%) likely reflects delayed recording post-antiepileptic initiation [20]; MRI offered the highest diagnostic yield, detecting additional lesions over CT in 56% of cases.

CONCLUSION

Adult-onset seizures in this rural Telangana cohort showed a broad clinical and etiological spectrum dominated by cerebrovascular disease (32%), with significant contributions from alcohol withdrawal, metabolic disturbances, and CNS infections. GTCS predominated across all etiological groups (88%), while focal seizures reliably indicated structural pathology. Hypertension was the leading comorbidity, underscoring the importance of vascular risk factor screening in elderly patients with new-onset seizures. Short-term outcomes were favourable in 66%, though a 30% recurrence rate highlights the need for sustained antiepileptic therapy and follow-up, particularly in structural aetiologies. Larger multicentre studies with long-term follow-up are warranted to define recurrence predictors and refine management protocols for rural Indian populations.

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