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Management of Convulsion in Cerebrovascular Accident (Stroke): An Observational Case Series from a Tertiary Care Hospital in India

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Abstract

Background: Post-stroke seizures are a clinically important complication of cerebrovascular accident (CVA), reported in 2–15% of survivors depending on stroke subtype, cortical involvement and severity. Optimal antiepileptic strategies remain debated, particularly in hemorrhagic stroke.

Objective: To describe the clinical profile, seizure characteristics and real-world pharmacological management of convulsions among acute stroke patients admitted to a tertiary neurology centre in eastern India.

Methods: A prospective observational case series of 60 consecutive adult patients with acute stroke and clinical or electrographic seizures was conducted at Sparsh Hospital, Bhubaneswar, between April and July 2022. Demographics, comorbidities, stroke type, imaging, daily seizure frequency and antiepileptic drug (AED) regimens were recorded over five hospital days.

Results: Mean age was 62.5 years (range 50–75); 40 patients (66.7%) were female. Hemorrhagic stroke predominated (50/60, 83.3%); ischemic stroke accounted for 10 cases (16.7%). Hypertension was universal; type 2 diabetes was present in 50% and chronic kidney disease in 16.7%. Seizure frequency at admission ranged from 0–8 per day (median 4). Levetiracetam was administered to all patients; phenytoin was added in 40 (66.7%). Seizure control was achieved in every patient by day 3–5. Twenty patients (33.3%) required intubation and sedation. In-hospital mortality during the observation window was 0%.

Conclusion: Prompt initiation of levetiracetam, with phenytoin reserved for more severe or refractory seizures, achieved rapid control of post-stroke convulsions in this cohort. Larger prospective studies are required to define optimal agent selection, dosing and treatment duration, especially in hemorrhagic stroke.

Keywords: Stroke; Seizure; Levetiracetam; Phenytoin; Hemorrhagic stroke; Case series; India

1. Introduction

Cerebrovascular accident (CVA), commonly termed stroke, remains the second leading cause of death worldwide and a principal contributor to long-term adult disability. Among its neurological sequelae, seizures occupy a particularly challenging niche. Population-based and hospital series consistently report an incidence of post-stroke seizures between 2% and 15%, the higher figures being associated with hemorrhagic stroke, cortical lesions and greater stroke severity. [1][2][3]

Post-stroke seizures are conventionally classified as early (acute symptomatic, occurring ≤7 days after the ictus) or late (unprovoked, >7 days). Early seizures reflect acute neuronal injury, blood–brain-barrier disruption and local metabolic derangement, whereas late seizures more closely resemble epilepsy and carry a higher risk of recurrence. The distinction has direct therapeutic implications: the former may require only short-term antiepileptic coverage, while the latter often mandates longer-term therapy.

Despite their clinical relevance, consensus on prophylactic or therapeutic antiepileptic drug (AED) use after stroke is lacking. Current guidelines generally advise against routine prophylaxis after ischemic stroke, yet practice varies widely in intracerebral hemorrhage, subarachnoid hemorrhage and post-craniectomy settings. Levetiracetam and phenytoin remain the agents most frequently employed in acute care, yet comparative effectiveness data specific to stroke populations remain limited. [4][5][6][7]

The present observational case series therefore aims to provide a detailed, real-world description of seizure characteristics, treatment patterns and short-term outcomes among 60 consecutive stroke patients with convulsions managed at a tertiary neurology centre in eastern India.

2. Methods

2.1 Study Design and Setting

A prospective observational case series was conducted at Sparsh Hospital, a tertiary-care neurology centre in Bhubaneswar, Odisha, India, between April and July 2022. The protocol was approved by the institutional ethics committee and the study was performed in accordance with the Declaration of Helsinki. Written informed consent was obtained from patients or their legally authorised representatives.

2.2 Participants

Sixty consecutive adult patients (≥18 years) admitted with acute ischemic or hemorrhagic stroke who experienced clinical or electrographic seizures were enrolled. Exclusion criteria comprised pre-existing epilepsy, traumatic brain injury (except as a concomitant finding), known intracranial tumour, and incomplete clinical records.

2.3 Data Collection

Daily structured data capture included demographics, vascular risk factors (hypertension, diabetes mellitus, chronic kidney disease), stroke subtype and imaging localisation (CT/MRI), seizure frequency and semiology, vital signs, laboratory parameters (serum electrolytes, renal function) and detailed AED regimens. Observation continued for five consecutive hospital days.

2.4 Outcome Measures

The primary outcome was reduction in daily seizure frequency over the five-day observation period. Secondary outcomes comprised need for endotracheal intubation or continuous sedation, hospital length of stay and in-hospital mortality.

2.5 Statistical Analysis

Descriptive statistics (means, ranges, proportions and percentages) were calculated. No formal inferential testing was undertaken given the observational design and absence of a concurrent control arm.

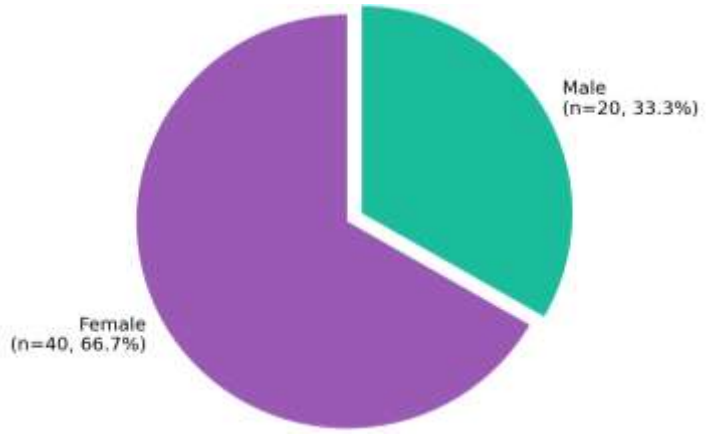


Fig 2: Sex distribution of the study cohort (n = 60).

3. Results

3.1 Baseline Characteristics

The cohort comprised 60 patients with a mean age of 62.5 years (range 50–75 years). Forty patients (66.7%) were female and 20 (33.3%) were male (Figure 2). Hypertension was present in every patient. Type 2 diabetes mellitus coexisted in 30 patients (50%) and chronic kidney disease in 10 patients (16.7%) (Figure 3).

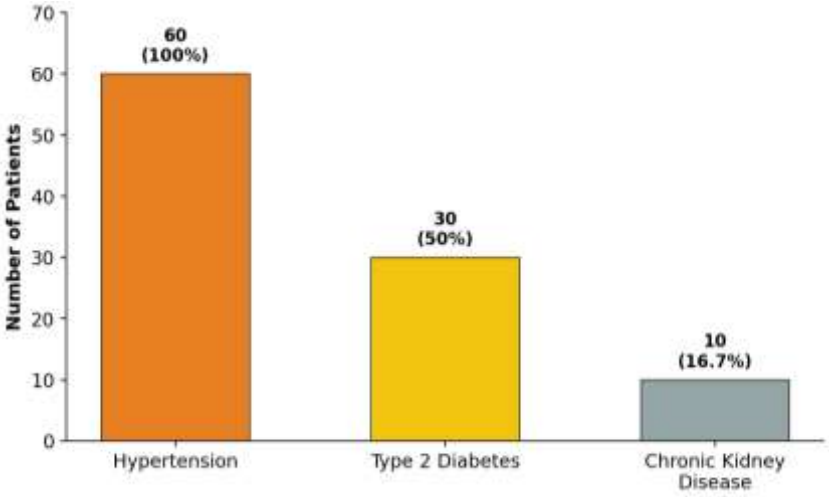


Fig 3: Prevalence of major comorbidities.

3.2 Stroke Subtype and Imaging

Hemorrhagic stroke accounted for 50 cases (83.3%), encompassing intracerebral hemorrhage involving the basal ganglia, frontal lobe or pons, as well as subarachnoid or extra-dural hemorrhage (10 patients with concomitant head injury). Ischemic stroke was diagnosed in the remaining 10 patients (16.7%), all of whom demonstrated acute infarction in the left frontal lobe on imaging (Figure 4).

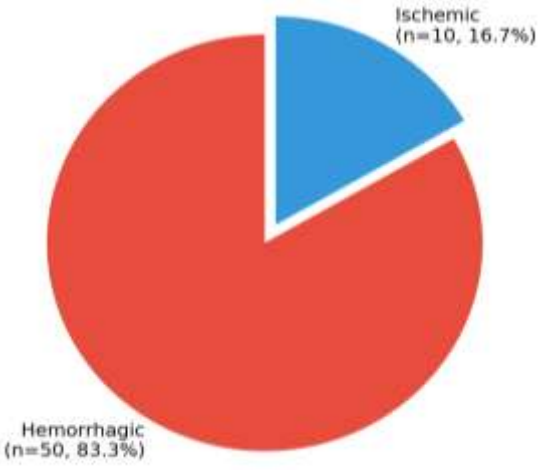


Fig 4: Distribution of stroke subtype (n = 60).

3.3 Seizure Characteristics

Seizure frequency at admission ranged from 0 to 8 events per day, with a median of 4 per day. Semiology was evenly divided: focal seizures with secondary generalisation in 30 patients (50%) and primary generalised tonic-clonic seizures in 30 patients (50%) (Figure 5). Status epilepticus was documented in 10 patients (16.7%).

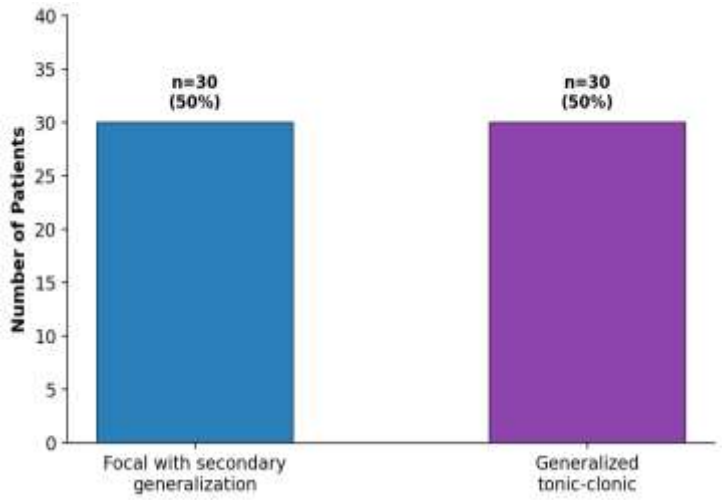


Fig 5. Seizure semiology distribution

3.4 Pharmacological Management

All 60 patients received intravenous levetiracetam (Inj. Levera / Levemac) at doses of 500–1000 mg twice daily. Phenytoin (Inj. Epsolin) 100–200 mg three times daily was added in 40 patients (66.7%) who exhibited higher seizure burden or status epilepticus. Supportive measures included mannitol for raised intracranial pressure, calcium-channel blockers (cilnidipine) for blood-pressure control, anti-emetics and citicoline as a neuroprotective adjunct.

3.5 Clinical Outcomes

Complete seizure control was achieved in every patient between hospital day 3 and day 5 (Figure 6). Twenty patients (33.3%) required endotracheal intubation and continuous sedation. No deaths occurred during the five-day observation window. Median length of stay was 7 days (range 5–10 days). Key treatment and outcome metrics are summarised in Figure 6 and Table 1.

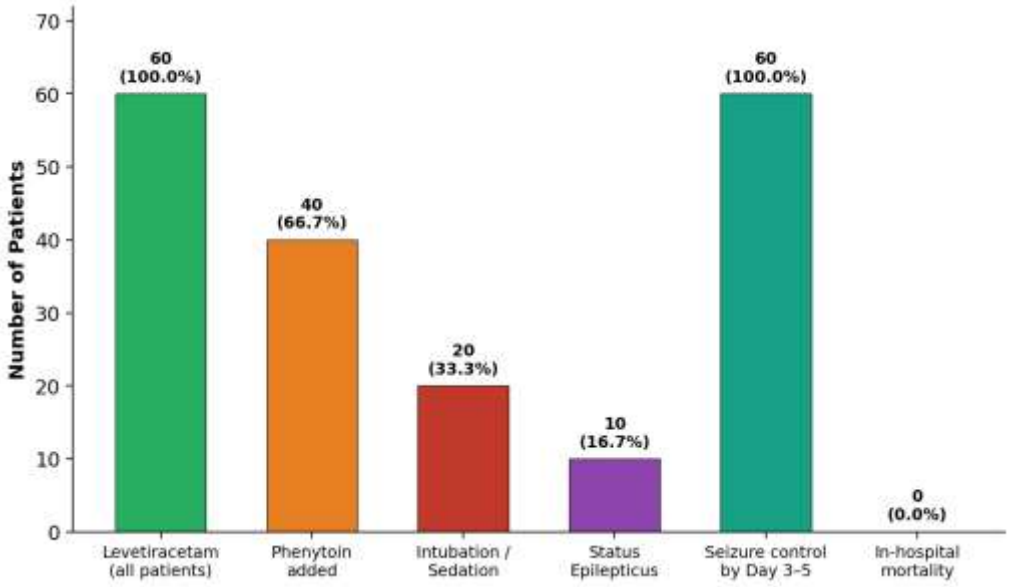


Fig 6: Treatment patterns and short-term clinical outcomes.

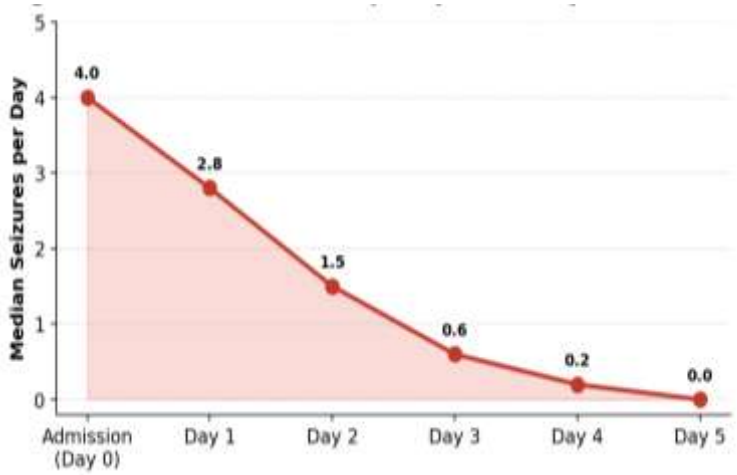


Fig 7: Illustrative trend of median daily seizure frequency during the observation period.

Table 1. Summary of demographic, clinical and outcome variables (n = 60)

Variable	n	%
Female sex	40	66.7
Male sex	20	33.3
Hemorrhagic stroke	50	83.3
Ischemic stroke	10	16.7
Hypertension	60	100
Type 2 diabetes mellitus	30	50.0
Chronic kidney disease	10	16.7
Status epilepticus	10	16.7
Levetiracetam (any dose)	60	100
Phenytoin added	40	66.7
Intubation / continuous sedation	20	33.3
Seizure control by day 3–5	60	100
In-hospital mortality (5-day window)	0	0

4. Discussion

This case series provides a pragmatic snapshot of the management of post-stroke convulsions in a real-world Indian tertiary-care setting. The striking predominance of hemorrhagic stroke (83.3%) mirrors published literature that consistently identifies intracerebral and subarachnoid hemorrhage as stronger risk factors for early seizures than ischemic infarction.

4.1 Seizure Burden and Stroke Severity

The wide range of seizure frequency at admission (0–8 per day) and the occurrence of status epilepticus in one-sixth of the cohort underscore the severity of the underlying cerebrovascular insults. Cortical involvement, present in the ischemic subgroup and in many of the lobar hemorrhages, is a well-recognised precipitant of both early and late seizures.

4.2 Antiepileptic Drug Selection

Levetiracetam was selected as first-line therapy in every patient, reflecting its favourable pharmacokinetic profile: minimal hepatic metabolism, low potential for drug–drug interactions and predominantly renal excretion—advantages of particular relevance in a population burdened by hypertension, diabetes and renal impairment. Phenytoin was reserved for patients with higher seizure burden or established status

epilepticus, consistent with contemporary second-line recommendations. The Established Status Epilepticus Treatment Trial (ESETT) demonstrated equipoise among levetiracetam, phenytoin and valproate, thereby supporting individualised agent selection based on comorbidity, availability and clinician familiarity.

4.3 Prophylaxis versus Treatment

Current guidelines do not endorse routine AED prophylaxis after ischemic stroke. In hemorrhagic stroke—especially with cortical involvement or after decompressive surgery—practice remains heterogeneous. All patients in the present series received therapeutic rather than purely prophylactic AEDs, driven by documented clinical seizures. The uniform achievement of seizure freedom within five days suggests that timely, protocolised initiation of levetiracetam (with or without phenytoin) is effective in the acute phase.

4.4 Strengths and Limitations

Strengths include consecutive enrolment, daily prospective recording of seizure counts and medication, and the inclusion of a substantial hemorrhagic-stroke majority that is often under-represented in seizure trials. Limitations are the moderate sample size, single-centre design, absence of a control group, short (five-day) observation window and lack of long-term epilepsy or recurrence data. Electroencephalographic confirmation was not systematically available for every seizure event.

5. Conclusion

Post-stroke convulsions in this tertiary-care cohort were successfully managed by prompt initiation of levetiracetam, with phenytoin added in two-thirds of patients who exhibited more severe or refractory seizures. Complete seizure control was obtained in all cases within three to five days, and short-term mortality was nil. These observations support a pragmatic, stepwise AED strategy in acute stroke care. Larger multicentre prospective studies with longer follow-up are needed to refine agent selection, optimal dosing schedules and the appropriate duration of therapy, particularly among patients with hemorrhagic stroke.

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Declarations

Ethics approval: The study was approved by the institutional ethics committee of Sri Jayadev College of Pharmaceutical Sciences and conducted in accordance with the Declaration of Helsinki.

Consent to participate: Written informed consent was obtained from all participants or their legally authorised representatives.

Competing interests: The authors declare no competing interests.

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