International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Clinical, Etiological and Radiological Profile of New Onset Seizures in Adults in Jammu Region In J&K

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Received: 03-05-2026
Accepted: 27-05-2026
Available online: 10-06-2026

ABSTRACT

Background: Adult-onset seizures are clinically important due to their diverse etiologies and significant impact on morbidity and socioeconomic burden. Identifying underlying causes is essential for appropriate diagnostic and therapeutic strategies.

Methods: A prospective cross-sectional study was conducted over 1.5 years at two hospitals in Jammu, India. One hundred adult patients (>18 years) presenting with fresh-onset seizures were enrolled. Clinical history, examination, laboratory investigations, CT brain, MRI brain (when indicated), and EEG were performed.

Results: The mean age of patients was 47.8 years, with a male predominance (58%). Generalized tonic-clonic seizures were the most frequent presentation (81%). CNS infections (38%) and cerebrovascular accidents (33%) were the leading etiologies, followed by metabolic derangements (16%), idiopathic causes (8%), and malignancies (5%). Viral meningoencephalitis was the most common infection and ischemic stroke was the most common vascular cause, while uremia was the predominant metabolic trigger. CT scans revealed abnormalities in 60.8% of patients, with MRI providing additional diagnostic yield in 33% of cases where CT was unremarkable. EEG abnormalities were noted in 14% of patients.

Conclusion: Many new onset seizures in adults are secondary, thereby, underscoring the importance of comprehensive evaluation for early identification of a treatable cause to reduce morbidity and socioeconomic burden. CNS infections and vascular causes were the most common ones and of course, are treatable. Regional differences, such as uremia being the most common metabolic cause, highlight the need for population-specific profiling and screening for causes of chronic kidney disease in this northernmost state of the country.

Keywords*: Adult onset seizure, Symptomatic seizure, New-onset seizure, Status Epilepticus*

INTRODUCTION

An epileptic seizure is a transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain.[1] On the other hand, epilepsy is a disorder of the brain characterized by an enduring predisposition to generate epileptic seizures, and by the neurobiologic, cognitive, psychological, and social consequences of this condition. About 5-10% of the population will have at least one seizure in their lifetime, the highest incidence occurring in early childhood and late adulthood.[2] A seizure can be a single event that doesn't always require treatment, whereas epilepsy is characterized by recurrent seizures necessitating long-term therapy. Seizures starting in adult life, many a times, have treatable causes, though we need a thorough workup to identify. Seizures at birth have usually perinatal causes and in childhood have genetic syndromes. Most common causes of fresh onset seizures in adults are idiopathic, trauma, cerebrovascular accidents (CVAs), infections involving central nervous system (CNS), metabolic derangements, drugs and space occupying lesions.[3] Studies have shown that magnetic resonance imaging (MRI) is superior to computerized tomography scan (CT) in detecting seizure foci but CT scan is an appropriate investigation in

emergency.[4] The decision to start and continue an anti-epileptic depends largely on the expected risk of seizure recurrence which in itself is influenced by etiology, lesion location, family history, occupation-related risks (e.g. pilots) etc. This study was an effort to evaluate the various clinical, etiological and investigational aspects in adults with new onset seizures in this northernmost part of the country.

METHODS

This study was conducted in the Department of Medicine, Government Gandhinagar Hospital, Jammu and Superspeciality Hospital, Government Medical College Jammu for a duration of 1.5 years. It was a prospective, cross-sectional study including a cohort of 100 adult patients (>18 years) presenting with fresh onset seizure either admitted as inpatients or attending the hospitals on outpatient basis. The study was commenced after due permission from the Institutional Ethics Committee, Government Medical College, Jammu and the data was collected after informed consent from all the study participants.

Inclusion criteria: Patients with age of onset 18 years or above for the first episode of seizure were considered and seizures were diagnosed according to ILAE Commission on Classification and Terminology.

Exclusion criteria: Those patients were excluded who presented with a first seizure with age of onset <18 years, those with recent traumatic brain injury (<6 months), post-operative seizures, peripartum causes (eclampsia), pseudo-seizures (PNES) or seizure like episodes (syncope, panic attacks) and those patients with history of substance abuse. Following detailed history and thorough clinical examination, necessary routine investigations were carried out in the patients such as complete blood count, random blood sugar, renal and liver function tests, serum electrolytes and NCCT brain. MRI brain and cerebrospinal fluid analysis were done wherever warranted.

The data collected are presented as percentages or mean ± standard deviation. The data association and difference in means were analyzed using Pearson's Chi-square test. P-values <0.05 were considered as statistically significant.

RESULTS

A total of 100 patients were included with a mean age of 47.8± 18.57 years. Majority of the subjects were of the age group of 41 – 50 years (n = 26) followed closely by the age group of > 60 years (n = 25). 58% of the study population were males and 42% were females. The male to female ratio in the study was 1.3: 1. Male gender preponderance was noted among all age groups. 16% study population presented with focal seizures and 81% presented with generalized tonic-clonic seizures. 3% patients presented with focal onset seizures with secondary generalization. Maximum prevalence of seizures was found in the fifth decade accounting for 26% of the total seizure cases. Fresh onset seizures in adults were significantly associated with increased prevalence in male gender but there was no association with age.

Table 1. Patient demographics.

Variable	Findings
Total patients	100
Mean age	47.8 ± 18.57 years
Most common age group	41–50 years (26 patients (26%))
Second most common age group	>60 years (25 patients (25%))
Gender distribution	58% male, 42% female
Male-to-female ratio	1.3 : 1

Table 2. Etiological Spectrum of Adult-Onset Seizures (n = 100).

Etiological Category	Subtype / Specific Cause	No. of Patients (Percentage)
CNS Infections (38)		
	Viral meningoencephalitis	20 (20%)
	Tuberculosis	10 (10%)
	Neurocysticercosis (NCC)	5 (5%)
	Bacterial meningitis	2 (2%)
	Cryptococcal meningitis	1 (1%)
Cerebrovascular (33)		
	Ischemic stroke	12 (12%)
	Intracerebral hemorrhage (ICH)	10 (10%)
	Subarachnoid hemorrhage (SAH)	4 (4%)
	Subdural hemorrhage (SDH)	3 (3%)
	Cerebral venous sinus thrombosis (CVST)	3 (3%)

	Infection-related arteritic infarct	1	(1%)
Metabolic (16)			
	Uremia	9	(9%)
	Hyponatremia	3	(3%)
	Hypocalcemia	2	(2%)
	Glycemic disturbances (hypo/hyper)	2	(2%)
Idiopathic (8)			
	Indeterminate causes	8	(8%)
Malignancy (5)			
	Primary or metastatic brain tumors	5	(5%)

The most common etiology for new onset seizures in adults in our patient population were CNS infections (n = 38) followed by cerebrovascular accidents (n = 33), metabolic derangements (n = 16), idiopathic/ indeterminate causes (n = 8), malignancies (n = 5). More females than males were observed to have seizures due to metabolic derangements, however, among other etiologies male preponderance was consistently seen. CNS infections causing seizures were noted mainly in the age groups of 21-40 years (n=16) and 41-60 years (n=15); CVAs and metabolic derangements were commoner in the age groups of 41-60 years (n=14; n=9) and >60 years (n=6; n=6). The most common CNS infection observed in our study population was viral meningoencephalitis (n=20) followed by tuberculosis (n=10), neurocysticercosis (n=5), bacterial meningitis (n=2) and cryptococcal meningitis (n=1). Among patients with CVAs, ischemic stroke (n=12) was the most common etiology followed by hemorrhagic stroke with ICH (n=10), sub-arachnoid hemorrhage (n=4), subdural hemorrhage (n=3), cerebral venous sinus thrombosis (n=3; venous infarcts in 2) and infection related arteritic infarct in one patient. Uremia predominated as the most common (n = 9) cause of metabolic derangement related fresh adult onset seizures. This in turn indirectly reflects the increasing disease burden of chronic kidney disease prevailing in the community. Following uremia, hyponatremia was the second most commonly observed abnormality (n=3) and others were hypocalcaemia and glycemic disturbances including hypoglycemia as well as hyperglycemia.

NCCT head was done in 97 of the subjects. Three patients had symptomatic seizures due to metabolic derangements which improved immediately with treatment and did not consent for CT scan. Out of 97 scans 39.18% (n=38) did not have any abnormal findings. Among the remaining scans, ischemic infarcts were the most common finding in 12.4% (n=12) followed by ICH in 10.3% patients (n=10). CVST was reported in three patients with venous infarcts in two of the patients. One patient had infection related arteritic infarct. Among other hemorrhages observed were SAH in 4 patients and SDH in 3 patients. 10.3% scans revealed indirect evidences of infection (tuberculoma, NCC, hydrocephalus, abscess, medial temporal/ insular hypodensity). Only postictal edema was seen in 3% of the subjects. While SOLs were reported in 5 scans (primary tumors, metastatic), 8 scans had nonspecific findings.

Table 3. Investigational Findings in Adult-Onset Seizures

Investigation	Total Patients	Normal Findings	Abnormal Findings	Key Abnormalities Observed (n)
CT Scan	97	38 (39.2%)	59 (60.8%)	Ischemic infarcts (12), ICH (10), SAH (4), SDH (3), CVST with venous infarct (2), arteritic infarct (1), infection-related findings (10), SOLs (5), postictal edema(3), nonspecific findings (8)
MRI Scan	43	4 (9.3%)	39 (90.7%)	Viral encephalitis (6), pachymeningeal enhancement (2), hypertrophic pachymeningitis (1), tuberculomas (2), NCC (2), CVST without infarct (1); reconfirmed CT findings in remainder
EEG	35	30 (85.7%)	5 (14.3%)	Generalized epileptiform discharges (2), localization-related epilepsy (3)

Positive CT scan findings were more common in the age groups of 41-60 and > 60 years old patients. A total of 43 subjects requiring further evaluation and work up for the cause of seizure were subjected to MRI scans on individual case basis. Among these 33% (n=14) MRI scans provided information over and above the NCCT brain scans done initially which were unremarkable. These patients were mainly the ones with infection related fresh onset seizures showing features of viral encephalitis (n=6), pachymeningeal enhancement (n=2) or focal hypertrophic pachymeningitis (n=1), tuberculomas (n=2), cystic/ vesicular NCCs (n=2), venous sinus thrombosis without infarct (n=1). 9% (n=4) of the MRI scans were normal while the remaining MRI scans reconfirmed CT brain findings. Only 35 of our patients underwent EEG and among these 5 were observed to be abnormal with 2 having generalized epileptiform discharges and 3 having localization related epilepsy.

Table 4. CT vs MRI Yield in Adult-Onset Seizures

Imaging Modality	Normal Findings	Abnormal Findings	Additional Yield
CT (n = 97)	38 (39.2%)	59 (60.8%)	–
MRI (n = 43)	4 (9.3%)	39 (90.7%)	14 (33% of cases - where CT was normal)

DISCUSSION

New onset seizures in adults have a unique significance because a large chunk of this subject population has secondary causes and belongs to an age group where they are actively working and contributing to the economy of the family and the community. An important point here is that by keeping a low threshold for targeting the precipitating factors and the underlying co-morbidities, we can limit the individual morbidity and also the economic burden on the families. Our study was conducted at two centres, one of which is a district hospital and the other is a tertiary care hospital, thereby representing the population of the division adequately at different levels of healthcare delivery. It comprised 100 subjects who fulfilled the inclusion criteria and signed an informed consent for being included. More of our study subjects were males with a gender ratio of 1.3:1 and this is comparable with most of the Indian and international studies showing a similar pattern.[7] Male preponderance may be the result of the higher incidence in males of definite risk factors for epilepsy like stroke, CNS infections and sleep deprivation.[23] Most of the fresh onset seizures in our study group were seen in the age group of 41-60 years followed by < 40 years and then >60 years age group. Other studies by Dhanasekar M et al (2014),[21] Chalasani et al (2015),[16] Kaur et al (2018),[7] Byju et al (2022)[24] and Sander et al.[13] have reported most common occurrence of seizures in the age group of < 40 years. This difference can be explained by the fact that we have excluded alcohol withdrawal, trauma and pregnancy related seizures from our study and all these contribute to seizure occurrence in the younger age group. Increasing age also has higher susceptibility to comorbidities, thereby contributing to the more frequent late onset seizures. Generalized seizures (81%) were more commonly seen than the focal seizures (16%) in our patient group and this is in agreement with the findings put forth in the respective studies by Dhanasekar M[21] among South Indian population, Kaur et al[7] in Punjab and Sander et al.[13] However, some authors like Chalasani et al,[16] Jalon et al,[26] and Murthy et al[25] observed that partial seizures are more common than generalized seizures in their study population.[9] This could be associated with ethnicity and also the level of literacy as eliciting history of partial seizures is more difficult and needs certain level of knowledge when compared to the more dramatic episode of generalized seizures. This may be a contributing bias.

The most common etiology of adult onset seizures in our patients were CNS infections (38%) followed by cerebrovascular causes (33%). Our findings corroborate with those of Chalasani et al.,(2015),[16] Rajadhyaksha et al.,[18] and Rao et al,[19] however, Dhanasekar M (2014)[21] reported alcohol withdrawal as the most common cause which was an exclusion in our study. Kaur et al. (2018)[7] and Sander et al[13] reported vascular causes as the most frequent ones. The etiology of the seizure depends on various factors like immune status, comorbidities, occupation, socioeconomic status and high-risk behaviours.[12,14] Thus, the regional and population wise difference among the most common etiology is unavoidable. Exclusion of trauma, intoxication, drug abuse, post-op status and pregnancy in our study was considered after careful deliberation to minimize bias creeping in and so that the order of other etiological causes can be better elucidated. Among the CNS infections, current study shows acute viral meningo-encephalitis as the most common cause followed by Tuberculosis and NCC. Our findings are in line with those of Masoodi ZA et al.[20] conducted in Kashmir and Rajadhyaksha et al.[18] Neurocysticercosis was the most common infection noted in the studies by Chalasani (2015)[16] and Rao et al.[19] Among the non-infectious causes cerebrovascular etiology was the most common followed metabolic causes and idiopathic seizures in decreasing order of frequency. Similar findings were put forth by Masoodi ZA et al.[20] in his study. Among the vascular causes ischemic infarcts were followed by hemorrhagic stroke with ICH. Among the metabolic causes, uremic seizures were the commonest followed by dyselectrolytemia (hyponatremia, hypocalcemia) and dysglycemia (hypoglycemia, hyperglycemia). Alcohol withdrawal seizures were most common non neurological cause in the studies by Kanitkar et al.,[8] Rajadhyaksha et al.,[18] and Rao et al.[19] Our observations were incongruent with those of other studies that showed hyponatremia as the most common metabolic cause. This reflects the disease burden of chronic kidney disease in our ethnic community and is cohesive with the national data suggesting a spike in chronic kidney disease among the non-communicable causes of death. Limited sample size could also have a bearing on this.

Non contrast CT head was used as the initial imaging modality to rule out intracranial etiologies and was reported normal in 39.2% patients and had findings in 60.8% patients. Infarcts included 12.3% ischemic infarcts, 2% venous infarcts and 1% infection related arteritic infarct. ICH was noted in 10.3%, SAH in 4.12% and SDH in 3.1%. Further, MRI scans were done only in 43 subjects needing more information beyond what CT scans could offer. 9% (n=4) of the MRI scans were normal and 33% scans (n=14) provided additional information in patients whose CT scans were unremarkable. This supports the high sensitivity and yield of CT scan brain along with high specificity and superiority of MRI scans in the evaluation of etiology of new onset seizures in adults. Our findings are in sync and concordance with the observations of Kaur et al.[7] and Hirani MM et al.[17] The main etiologies in CT scan were vascular i.e., hemorrhagic stroke more than ischemic stroke followed by infections and malignancy. Similar findings were observed in Kaur et al.[7] In MRI scans also vascular causes were front runners but ischemic more than hemorrhagic followed by infections and malignancy in concordance with Kaur et al,[7] Dhanasekar et al.[21] and Gavala et al.[22] MRI scans showed superiority in evaluating

infections as a cause of adult onset new seizures with 14 scans showing findings in whom CT brain was unremarkable.[27,28]

Certain findings were incongruent with other researchers like uremic seizures being most common metabolic cause of seizure. These differences need further evaluation with a larger patient cohort to evaluate the differences based on ethnic, regional, socio-economic or cultural factors and also to evaluate the bias on account of limited patients included. It is pertinent to point out here that there may be a need for regional profiling of patients presenting with fresh onset seizures, particularly with respect to attendant comorbidities and lifestyle choices. Not all patients who underwent CT scan were able to get MRI scan and even fewer underwent EEG. This was mainly due to long dated queues of EEGs in our set up and also due to lack of public awareness regarding need for evaluating a cause of seizure. Financial constraints were also a limitation in a few cases.

To conclude, the gist of the observations in our study include a male preponderance in adult new onset seizures with a male to female ratio of 1.3: 1 and the most common presentation among the patients in the age group of 41-50 years of age, followed closely by >60 years age group. Generalized seizures were the most common presentation with CNS infections as the most common etiology followed closely by vascular causes.

REFERENCES

1. Daniel HL, et al. Harrison's principles of internal medicine. 21st ed. Vol 2. USA; 2022. p.2542-9.
2. Daniel HL, et al. Harrison's neurology in clinical medicine. 4th ed. Vol 2. USA; 2016. p.236.
3. Honavar AG, et al. Profile of patients presenting with seizures as emergencies and immediate non-compliance to antiepileptic medications. J Family Med Prim Care. 2019;8(12):3977-82.
4. Travinh E, Lanzman B, Provenzale J, Wintermark M. Imaging of the adult presenting with new-onset seizure. AJR Am J Roentgenol. 2019;212(1):15-25. PMID:30299997.
5. International League Against Epilepsy. Definition of 2017. Available from: http://www.ilae.org/visitors/centre/detinition-2017.cim.
6. Santhosh NS, Sinha S, Satishchandra P. Epilepsy: Indian perspective. Ann Indian Acad Neurol. 2014;17(Suppl 1):S3-11. doi:10.4103/0972-2327.128643. PMID:24791085. PMCID:PMC4001222.
7. Kaur S, Garg R, Aggarwal S, Chawla SP, Pal R. Adult onset seizures: Clinical, etiological, and radiological profile. J Family Med Prim Care. 2018;7:191-7.
8. Kanitkar SA, et al. Study of seizure disorder in elderly: Etiology, types, EEG and imaging findings. Transworld Med J. 2013;1:24-5.
9. Ashwin, et al. Int J Adv Med. 2017;4(2):490-6.
10. Franco AC, Parreira S, Bentes C, Pimentel J. Management of a first unprovoked epileptic seizure in adolescence and adulthood. Epileptic Disord. 2021;23(4):537-51. doi:10.1684/epd.2021.1296.
11. Crocker CE, Pohlmann-Eden B, Schmidt MH. Role of neuroimaging in first seizure diagnosis. Seizure. 2017;49:74-8. doi:10.1016/j.seizure.2016.05.015. PMID:27324840.
12. Hosalli NK, Vasudevan MS, Jalageri MI. Clinical and etiological profile of new-onset seizure in adults reporting to tertiary care centre, Mysore. Int J Adv Med. 2022;9:322-9.
13. Sander JW, et al. National general practice study of epilepsy: Newly diagnosed epileptic seizure in general population. Lancet. 1990;336:1267-71.
14. Sendil G, Kumar AN, Kumar MV. Late onset shake-etiology at stake: A prospective study. Int J Sci Study. 2014;2:20-4.
15. Quraishi SM, Rani PS, Prasanthi P, Sudhakar P. Etiological profile of new-onset seizures. J Evid Based Med Healthc. 2015;2:7032-42.
16. Chalasani S, Kumar MR. Clinical profile and etiological evaluation of new-onset seizures after age 20 years. IOSR J Dent Med Sci. 2015;14:97-101.
17. Hirani MM, Shrivastva S. Clinical profile of new-onset seizures in adults. Indian J Appl Res. 2015;5:19-21.
18. Rajadhyaksha GC, Singh AC. New-onset seizures in adults. Int J Educ Res Health Sci. 2017;3(1):42-7.
19. Rao BS, Matta S, Verma GA. Etiological profile in new-onset seizures in India. Int J Adv Med. 2015;2(1):6-12.
20. Masoodi ZA, et al. Prevalence and etiology of seizures in Kashmir. J Med Sci Clin Res. 2016;4:–.
21. Dhanasekar M. Kilpauk Medical College repository. Chennai; 2014.
22. Gavvala JR, Schuele SU. New-onset seizures in adults and adolescents: A review. JAMA. 2016;316(24):2657-66. doi:10.1001/jama.2016.18625. PMID:28027373.
23. Kotsopoulos IAW, van Merode T, Kessels FGH, de Krom MCTFM, Knottnerus JA. Systematic review and meta-analysis of incidence studies of epilepsy and unprovoked seizures. *Epilepsia*. 2002;43(11):1402-9. doi:10.1046/j.1528-1157.2002.t01-1-26901.x. PMID:12423392.
24. Byju N, Biju PR, Mathew DS. A clinical study on adult onset seizures in tertiary care centre in South India. IOSR J Dent Med Sci. 2022;21(1, Ser.5):6-13. doi:10.9790/0853-2101050613.
25. Narayanan JT, Murthy JM. New-onset acute symptomatic seizure in a neurological intensive care unit. Neurol India. 2007;55(2):136-40. doi:10.4103/0028-3886.32784. PMID:17558117.

26. Jallon P, Loiseau P, Loiseau J. Newly diagnosed unprovoked epileptic seizures: presentation at diagnosis in CAROLE study. Epilepsia. 2001;42(4):464-75. doi:10.1046/j.1528-1157.2001.31400.x. PMID:11440341.
27. Lee RK, Burns J, Slavin K, Utukuri PS, Corey AS. ACR Appropriateness Criteria® Seizures and Epilepsy. J Am Coll Radiol. 2020;17(5 Suppl):S293-S304. doi:10.1016/j.jacr.2020.01.046. PMID:32470335.
28. Nieto-Salazar MA, Velasquez-Botero F, Toro-Velandia AC, Saldana-Rodriguez EA, Rodriguez-Rodriguez ME, Gupta A, et al. Diagnostic implications of neuroimaging in epilepsy and other seizure disorders. Ann Med Surg (Lond). 2023;85:73-5. doi:10.1097/MS9.0000000000000155. PMID:36845800