

ORIGINAL ARTICLE

POST-STROKE SEIZURE IN PATIENTS ADMITTED TO TIKUR ANBASSA SPECIALIZED HOSPITAL

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ABSTRACT

Introduction: Stroke is a devastating neurological emergency with high mortality and morbidity rate. Stroke has been considered as a major cause of seizures and in fact a leading cause of epilepsy in the elderly. Little is known about the magnitude and outcome of stroke related seizures in Ethiopia. We studied patients who were admitted with the diagnosis of stroke, their clinical presentation, associated complications and outcome.

Methods: This is a cross-sectional study based on analysis of clinical charts of patients admitted with the diagnosis of ischemic and hemorrhagic stroke to Tikur Anbassa Hospital from January 2009 to January 2012. Disability was measured using the Modified Rankin Scale. Data was collected from all charts with the diagnosis of stroke using a pre-prepared questionnaire, analyzed using SPSS version 20, and summarized using tables.

Results: During the study period, there were 174 patients who were admitted with the diagnosis of stroke. Among these, 148 were included in the study. Of these, 14 patients with subarachnoid hemorrhage, five patients with venous strokes and seven patients who did not have imaging study were excluded from the study. Of the 148 patients, 37(25%) had different forms of seizure. Of the 76 patients with ischemic stroke 14/ (18.6%) and 23 (31.9%) of the 72 patients with hemorrhagic stroke had seizures.

Conclusion: In this study, a substantial proportion of the patients developed seizure. The frequency of seizures in this study is similar with reports of studies conducted elsewhere. A well-designed epidemiological study is recommended to determine the magnitude, associated risk factors and clinical profile of seizures among adult patients with stroke.

Key words: Stroke, Seizures in stroke-patients, Ethiopia.

INTRODUCTION

Stroke has been considered a major cause of seizures and in fact a leading cause of epilepsy in the elderly (1,2). The frequency of seizures following stroke has reportedly been variable, ranging from 3.4% to 10% (3-5). Seizures that occur following stroke are also classified variably. Some have classified early onset seizures as those that are seen in the first two weeks after the stroke (6,7) while some consider early onset seizures as those that occur in the first 48 hours following stroke. Some have extended this time to seven days for early seizures and late onset for seizures that occur seven days following the stroke (8-10). Late seizures have most commonly been described as occurring at least two weeks after stroke (11,12)

The incidence of acute seizures is found to be 3.1% in one study while late seizures ranging from 3%-67% depending on the design and length of follow up of the study (8,13). Cerebrovascular disease has been found to be the most commonly identified etiology of secondary epilepsy about 11%. Stroke accounts for 30% of newly

diagnosed seizures in patients above 60 years of age (4-7). In one study there was a two percent proportion of post stroke epilepsy over a median period of 9 months and increased to a four per cent over a median period of two years in another study (8,13).

Ischemic stroke subtype, stroke location, and stroke severity have been considered as possible predictors of seizure development. Stroke subtype results of clinical and autopsy studies have suggested that seizures are more common with cardioembolic infarction than other types of ischemic stroke (14-16). But the results of other studies did not show such an association (17,18).

Although seizures seem to be more common after strokes with cortical involvement, they may also occur in the setting of subcortical ischemic stroke. Stroke severity is the most important determinant of outcome in stroke patients. But seizures were not found to be related to poor outcome (9,19). To the best of our knowledge, the magnitude of seizures and its outcome among stroke patients has not been reported from Ethiopia.

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The objective of this study was to determine the hospital prevalence of seizures in stroke patients and look into the difference in outcome between patients who had seizures and who did not have seizures. The study also looked into the difference in the hospital prevalence of seizures among patients with ischemic and hemorrhagic stroke.

PATIENTS AND METHODS

A cross-sectional admission analysis of records of all patients diagnosed to have stroke from January 2009 to January 2012 at Tikur Anbessa Specialized Hospital (TASH), a tertiary care Hospital of Addis Ababa University, was made. All patients with ischemic and hemorrhagic stroke were included. Patients with subarachnoid hemorrhage (SAH), those patients with no imaging study and patients with venous strokes were excluded from the study. Early onset seizures were defined as seizures occurring in the first seven days of the stroke, while late seizures were considered as those occurring after the seven days of stroke. Disability and outcome was measured using the modified Rankin Scale. Scores 1 and 2 were considered as good recovery and score 3 as moderate disability, while 4 and 5 was considered as severe disability and score 6 is death.

Data was collected from all patient charts with the diagnosis of stroke using a questionnaire, which was designed for purposes of this study. The questionnaire contained socio-demographic data, clinical presentations, course in the hospital, laboratory and imaging studies and treatment and treatment outcomes.

Data was entered, cleaned, and analyzed using SPSS Version 20 and results were compared with the previous studies and similar studies that were done in other parts of the world. Ethical clearances was obtained from Research and Ethics Committee of the Department of Neurology at TASH.

RESULTS

During the study period there were 174 patients admitted with the diagnosis of stroke. Of these, 14 patients with SAH, five with venous strokes and seven who did not have imaging study were excluded from the study. The mean age of the 148 patients was 52.9 with SD (± 18.4).

Of the 148 patients 71(48%) were females and 77(52%) males. In this study, 76(51.4%) of the patients had ischemic while 72(48.6) of them had hemorrhagic stroke. Among these 148 patients 91(61.5%) came from Addis Ababa 34(22.9%) from the Oromia, 16(10.8%) from Amhara and six (4.1%) from SNNPR regions.

Death occurred in 39/148 (26.3%) and 12/39(30.7%) while 27/39 (69.2%) occurred in the ischemic and hemorrhagic stroke group, respectively. Seventy eight (52%) had moderate to severe disability whereas two patients were discharged in a vegetative state. Thirty patients (20.2%) were discharged showing good recovery (Table 1). The mean duration of stay in the hospital (admission to discharge from hospital or death) was 19.3 (± 12.3) days.

Table 1: Stroke outcome among patients with and without post-stroke seizures in 148 patients admitted to Tikur Anbessa Specialized Hospital, from January 2009 to January 2012

Stroke type	Seizures	Disability			Total
		Death	Good Recovery	Moderate	
Hemorrhagic	No	15	13	11	49
	Yes	12	5	2	23
	Sub-total	27	18	13	72
Ischemic	No	6	10	17	62
	Yes	6	2	1	14
	Sub-total	12	12	18	76
Total	No	21	23	28	111
	Yes	18	7	3	37
Total	Total	39	30	31	148

Of the 148 patients, 37(25%) patients had different forms of seizures. Of the 76 patients with ischemic stroke 14 (18.6%) and 23 (31.9%) of the 72 patients with hemorrhagic stroke had seizures. Seven of the seizures in ischemic stroke and 10 in the hemorrhagic stroke group occurred at the onset. Among the 14 with seizures in the ischemic stroke group two had focal, one focal seizure with cognitive dysfunction, nine generalized and two had generalized status epilepticus type of seizures. While in the hemorrhagic stroke group among the 23 patients, five had focal, three focal seizure with cognitive dysfunction, 14 generalized and two had generalized status epilepticus.

Among 14 patients with seizures in the ischemic stroke group six died, while 11 out of the 23 patients in the hemorrhagic stroke group died (Table 2). Among the 23 patients with seizures in the hemorrhagic stroke group 16 had cortical, five thalamic bleeds and 11 showed ventricular extension. Among the 14 patients with ischemic stroke, 12 had a cortical lesion while the rest had subcortical lesion.

Table 2: Stroke outcome among patients by seizure type in 148 patients admitted to Tikur Anbessa Specialized Hospital, January 2009- January 2012

Stroke type	Seizure type	Outcome			Total
		Death	Good recovery	Moderate to severe disability	
Hemorrhagic	Focal & focal with cognitive dysfunction	3	3	2	8
	Generalized	8	3	4	15
	No	16	12	21	49
	Sub-total	27	18	27	72
Ischemic	Focal & focal with cognitive dysfunction	1	0	2	3
	Generalized	5	2	4	11
	No	6	10	46	62
	Sub-total	12	12	52	76
Total		39	30	79	148

DISCUSSION

In this study, seizures that occur in the first week were considered as early and those that occur beyond the first seven days as late seizures. Based on the above definition 75.6% of all seizures occurred in the first week. Of these seizures, 45.9% occurred at the onset. In the ischemic stroke group 50% and 43.4% of the seizures in the hemorrhagic stroke group occurred at the onset. The rest 24.3% of seizures occurred in the second week. Different studies have shown that the frequency of early post stroke seizures range from two per cent to 33% (5,8,9,12,13) 50-78% of these seizures occur within the first 24 hours following stroke (20-22). The results in this study fall in the range of numbers given in different large studies.

The frequency of seizures is also different in hemorrhagic and ischemic strokes. In this study, it was found out that 18.4% and 31.9% of the patients with ischemic and hemorrhagic stroke, respectively, had seizures. The magnitude varies based on the numbers or patients and methods used

in the study and numbers range from 2.3% to 43% (23). Among the 37 patients with seizure, 69.5% and 85.7% in the hemorrhagic and ischemic stroke group respectively had cortical involvement. Five patients 13.5% had thalamic stroke. Eleven patients with seizures have shown ventricular extension. In this study a significant proportion of the patient with seizures in both groups showed cortical involvement. In those patients who had seizures 56.7% had parietal, 32.4% had temporal and 27% had frontal cortical involvements in different combination while 18.9% had thalamic lesions. Cortical involvement is found to be a risk factor in many other studies (17, 20-22, 23-25)

This study can be used as a foot step for further larger and prospective studies. This study has several limitations. This is a retrospective study which causes underassessment of cases. Poor record keeping lead to loss of some of the vital data for the study which lead to difficulty in analysis. Due to the smallness of the sample size it was difficult to do statistical analysis for many variables included in the study. In conclusion, in this study, we have found that significant number of patients has developed

seizures following stroke and seizures should be considered as an important medical complication in patients with stroke and there is a need to prepare adequate settings for the treatment of seizures in the acute state. We recommend a well-designed study with prospective data collection that will circumvent most of the limitations mentioned above.

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REFERENCES

- Loiseau J, Loiseau P, Duche B, Guyot M, Dartigues JF, Aublet B. A Survey of epileptic disorders in southwest France: seizures in elderly patients. *Ann Neurol.* 1990;27:232–37.
- Hauser WA, Ramirez-Lassepas M, Rosenstein R. Risk for seizures and epilepsy following cerebrovascular insults. *Epilepsia.* 1994; 25:666.
- Pohlmann-Eden B, Hoch DB, Cochius J, Hennerici MG. Stroke and epilepsy: Critical review of the literature Part I. *Cerebrovasc Dis.* 1996;6:332-38.
- So EL, Annegers JF, Hauser WA, O'Brien PC, Whisnant JP. Population-based study of seizure disorders after cerebral infarction. *Neurology.* 1996;46:350-55.
- Kilpatrick CJ, Davis SM, Tress BM, Rossiter SC, Hopper JL, Vandendriesen ML. Epileptic seizures in acute stroke. *Arch Neurol.* 1990;47:157-60
- Hauser WA, Annegers JF, Kurland LT. Incidence of epilepsy and unprovoked seizures in Rochester, Minnesota; 1935-1984. *Epilepsia.* 1993;34:453-68.
- Forsgren L, Bucht G, Eriksson S, Bergmark L. Incidence and clinical characterization of unprovoked seizures in adults: a prospective population based study. *Epilepsia.* 1996;37:224-29.
- Burn J, Dennis M, Bamford J, Sandercock P, Wade D, Warlow C. Epileptic seizures after a first stroke: the Oxfordshire Community Stroke Project. *BMJ.* 1997; 315:1582–587
- Labovitz DL, Hauser WA, Sacco RL. Prevalence and predictors of early seizure and status epilepticus after first stroke. *Neurology.* 2001;57: 200–06.
- Lamy C, Domigo V, Semah F, et al. JL. Early and late seizures after cryptogenic stroke in young adults. *Neurology.* 2003;60:400–04.
- Lo YK, Yiu CH, Hu HH, Su MS, Laeuchli SC. Frequency and characteristics of early seizures in Chinese acute stroke. *Acta Neurol Scand.* 1994;90:83-5.
- Gupta SR, Naheedy MH, Elias D, Rubino FA. Postinfarction seizures. A clinical study. *Stroke.* 1988;19:1477-481.
- Bladin CF, Alexandrov AV, Bellavance A, et al. Seizures after stroke: a prospective multicenter study. *Arch Neurol.* 2000;57:1617–622.
- Giroud M, Gras P, Fayolle H, Andre´ N, Soichot P, Dumas R. Early seizures after stroke: a study of 1,640 cases. *Epilepsia.* 1994;35:959-64.
- So EL, Annegers JF, Hauser WA, O'Brien PC, Whisnant JP. Population-based study of seizure disorders after cerebral infarction. *Neurology.* 1996;46:350–55.
- Lesser RP, Luders H, Dinner DS, Morris HH. Epileptic seizures due to thrombotic and embolic cerebrovascular disease in older patients. *Epilepsia.* 1985;26:622–30.
- Bogousslavsky JL, Van Melle G, Regli F. The Lausanne Stroke Registry: analysis of 1000 consecutive patients with first stroke. *Stroke.* 1988;19: 1083–092.
- Kittner SJ, Sharkness CM, Price TR, et al. Infarcts with a cardiac source of embolism in the NINCDS Stroke Data Bank: historical features. *Neurology.* 1990;40:281–84.
- Reith J, Jorgensen HS, Nakayama H, Raaschou HO, Olsen TS. Seizures in acute stroke: predictors and prognostic significance. The Copenhagen Stroke Study. *Stroke.* 1997;28(8):1585-9
- Blum DE, Eskola J, Bortz JJ, Fisher RS. Patient awareness of seizures. *Neurology.* 1996;47:260–64.
- Arboix A, Comes E, Massons J, et al. Prognostic value of very early seizures for in-hospital mortality in atherothrombotic infarction. *Eur Neurol.* 2003;50:78–84.

22. Rumbach L, Sablot D, Berger E, Tatu L, Vuillier F, Moulin T. Status epilepticus in stroke. Report on a hospital-based stroke cohort. *Neurology*. 2000;54:350–54.
23. M. I. Lossius, O. M. Rønning P. Mowinckel and L. Gjerstad: Incidence and predictors for post-stroke epilepsy: *European Journal of Neurology*. 2002, 9: 365-68
24. Schulz UG, Rothwell PM. Transient ischaemic attacks mimicking focal motor seizures. *Postgrad Med J*. 2002;78:246-47.
25. Ross DT, Ebner FF. Thalamic retrograde degeneration following cortical injury. An Excitotoxic process? *Neuroscience*. 1990;35:525-550.