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Research Article

**FREQUENCY OF GENERALIZED SEIZURES IN PATIENTS  
PRESENTING WITH ACUTE STROKE**<sup>1</sup>Dr. Muhammad Hassan Sheikh, <sup>2</sup>Dr. Aijaz Ali, <sup>3</sup>Dr. Anila Umer<sup>1</sup>Agha Khan University Hospital, Karachi, Pakistan<sup>2</sup>Jinnah Post Graduate Medical Centre Karachi, Pakistan<sup>3</sup>Jinnah Post Graduate Medical Centre Karachi, Pakistan**Abstract:**

**Background:** Stroke is second most common cause of death worldwide. Stroke-related seizures are a neglected topic and generally considered as a benign and a harmless complication. Post stroke seizures can worsen the condition of patients so this study finds the extent of post stroke seizures in local population.

**Objective:** To assess the frequency of generalized seizures in patients presenting with acute ischemic stroke.

**Material and Methods:** Department of Neurology, Agha Khan University Hospital, Karachi.

**Design:** Descriptive case series.

**Subject & Methods:** There were 150 patients presenting with acute ischemic stroke were included in this study. They were followed-up for 15 days after stroke to assess post-stroke seizures.

**Results:** The mean age of patients was 57.37±11.18 years. Frequency of generalized seizures in patients presenting with acute ischemic stroke was found in 6.67%.

**Conclusion:** Generalized seizures in patients presenting with acute ischemic stroke was low.

**Key Words:** Acute ischemic stroke, generalized seizures, cardiovascular disease.

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**INTRODUCTION:**

Stroke is the second most common cause of death worldwide [1] and the third most common cause of death in the developed world. Strokes cause over 5.5 million deaths annually [2] and two thirds of these occur in the developing world [3]. The various stroke subtypes have demonstrated significant variability between different geographical regions as well as different ethnic groups within the same geographic region. These differences in stroke characteristics have significant impact on strategies of stroke prevention, diagnosis and treatment. The frequency of ischemic stroke in Pakistan is 72% [1]. Stroke-related seizures are a neglected topic and generally considered as a benign and a harmless complication occurring in the course of a longstanding and progressive cerebral and cardiovascular disease [2].

It has been reported that seizures (definition varying from the first 24 hours to the first 4 week post stroke) usually occur at the stroke onset in 1.8–15% of patients and constitute the majority of post stroke seizures [3]. Chiang found that incidence of seizures was 9.1% in cases of ischemic stroke [4]. Blad in reported that in about 8.6% cases of ischemic stroke developed seizures [5]. Rationale of this study is to find the frequency of generalized seizures in patients presenting with acute ischemic stroke. Post stroke seizures can worsen the condition of patients. After stroke, development of seizures had high rates of mortality as compared to patients who do not develop seizures after stroke. Literature has reported contradiction about incidence of seizures after stroke, as some reported very low frequency while other reported as high. Moreover, there is no local data available from which we can assess the incidence of post stroke seizures in patients of acute ischemic stroke. So we want to conduct this study to find the extent of post stroke seizures in local population.

**OBJECTIVE:**

To assess the frequency of generalized seizures in patients presenting with acute ischemic stroke.

**MATERIALS AND METHODS:**

**Study Design:** Descriptive case series.

**Setting:** Department of Neurology, Agha Khan University Hospital, Karachi.

**Duration:** Six month from July 2017 to December 2017.

**Sample size:** Sample size of 150 cases is calculated with 95% confidence level, 4.5% margin of error and taking expected percentage of seizures i.e. 8.6% inpatients presenting with acute ischemic stroke.

**Sampling technique:** Non-Probability, Consecutive sampling.

**Selection criteria****Inclusion Criteria:**

Patients of age 16-80 years of either gender presenting with acute ischemic stroke. Stroke was assessed as presence of one or more of the following:

- Inability to move one or both limbs on one side of the body
- Inability to understand commands or formulate speech.
- Inability to see one side of the visual field
- Numbness of one half of the body and confirmed by Magnetic Resonance Imaging (MRI) brain showing an area of diffusion restriction on diffusion weighted images (DWI) (high signal on DWI and corresponding low signal on ADC).

**Exclusion Criteria:**

- patients had preexisting neurologic conditions various neurologic deficits (e.g. stroke, head trauma, and hypoxic encephalopathy) (medical record)
- patients had a history of seizure disorders or epilepsy
- Patients regularly taking AEDs for clinical indications other than epilepsy (e.g. trigeminal neuralgia or neuropathic pain) on medical record and history.

**Data collection:** 150 patients fulfilled the selection criteria were enrolled in the study from emergency of Department of Neurology, Agha Khan University Hospital, Karachi. Informed consent was obtained from attendants of each patient. A demographic detail (name, age, gender and contact) was also noted. Then patients were admitted to ward and was followed-up there. Then patients were discharged and were followed-up in OPD. They were counseled about seizures and to report if seizures develop and were advised to visit in OPD after 15 days of stroke. During this time period if seizures will occur, then it was noted (an epileptic seizure is a transient occurrence of signs and symptoms due to abnormal excessive or synchronous neuronal activity in the brain and generalized seizures, which is type of seizure that originates from multiple brain foci and is characterized by generalized rather than localized neurological symptoms may be tonic-clonic and may progress from a focal seizure during 15 days of post-stroke period that was assessed by clinical examination). All this information was recorded in the proforma.

**Data Analysis:** The data was entered and analyzed through SPSS version 20. Mean and SD was calculated for quantitative variables like age and duration of symptoms. Frequency and percentage was given for qualitative variables like gender, hypertension, diabetes mellitus and seizures. Data

was stratified for age, duration of symptoms, gender, hypertension and diabetes mellitus. Chi-square was applied to compare stratified groups. P-value  $\leq 0.05$  was taken as significant.

### RESULTS:

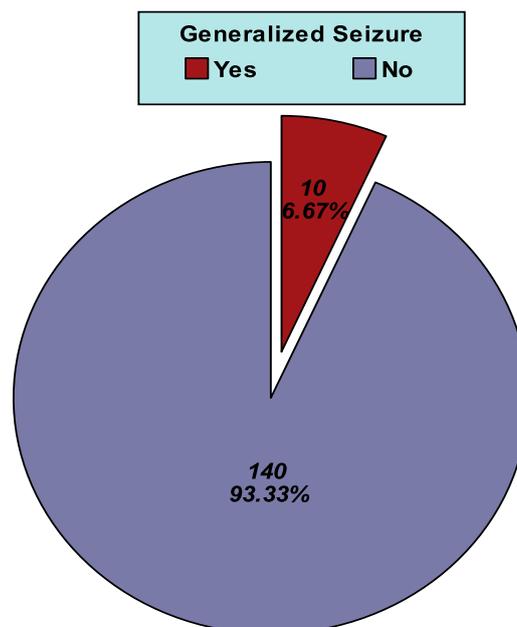
There were 150 patients presenting with acute ischemic stroke were included in this study. The average age of the patients was  $57.37 \pm 11.18$  years. Most of the patients were above 50 years of age. Out of 150 cases, 83(56.33%) were male and 67(44.67%) female. Hypertension was observed in 80% cases while 35.35% cases had diabetic mellitus. The mean duration of symptoms was

$2 \pm 1.66$  days and length of hospital stay was  $3.03 \pm 2.19$  days. Table 1 Frequency of generalized seizures in patients presenting with acute ischemic stroke was found in 6.67% (10/150). Fig 1

There was no case of generalized seizures in  $\leq 40$  year old cases but in patient  $>40$  years, the frequency was high in middle aged patients. The frequency of generalized seizures was significantly high in females as compared to males. Hypertension and diabetes did not show effect on development of seizures. While duration of symptoms  $>3$  days old, then chances of post-stroke seizures are significantly high. Table 2

**Table 1: Baseline characteristics of patients (n=150)**

Age (Years)	$57.37 \pm 11.18$
$\leq 40$ years	16 (10.7%)
41-50 years	21 (14%)
51-60 years	46 (30.7%)
61-70 years	67 (44.7%)
Male	83 (55.3%)
Female	67 (44.7%)
Hypertension	120 (80%)
Diabetes	53 (35.3%)
Duration of symptoms (days)	$2 \pm 1.66$
Length of stay (days)	$3.03 \pm 2.19$



**Fig 1: frequency of generalized seizures in patients presenting with acute ischemic stroke (n=150)**

**Table 2: Risk stratification of generalized seizures in patients with acute ischemic stroke.**

	GENERALIZED SEIZURES		p-value
	Yes n=10	No n=140	
Age (Years)			
≤40	0(0%)	16(100%)	0.361
41 to 50	1(4.8%)	20(95.2%)	
51 to 60	2(4.3%)	44(95.7%)	
61 to 70	7(10.4%)	60(89.6%)	
Gender			
Male	0(0%)	83(100%)	0.0005
Female	10(14.9%)	57(85.1%)	
Hypertension			
Yes	8(6.7%)	112(93.3%)	>0.999
No	2(6.7%)	28(93.3%)	
Diabetes			
Yes	4(7.5%)	49(92.5%)	0.740
No	6(6.2%)	91(93.8%)	
Duration of symptoms			
1-2	8(5.5%)	137(94.5%)	0.036
>3	2(40%)	3(60%)	

**DISCUSSION:**

Stroke and seizures are amongst the commonest serious neurological problems worldwide. Furthermore, stroke is the most common identified cause of new-onset seizures in the elderly, accounting for perhaps over 35% of new onset symptomatic epilepsy occurring over the age of 60 years [6,7]. Post stroke seizures have been described in numerous clinical studies for many years [8]. Post stroke seizures can occur soon after the onset of ischemia or can be delayed [9].

In our study, there were 150 patients of age 16-80 years of either gender presenting with acute ischemic stroke. Most of the patients were above 50 years of age. The average age of the patients was a  $57.37 \pm 11.18$  year which is consistent with the previously reported increased incidence of Post Stroke Seizures in middle aged or elderly patients [10]. Dhenuka et al. have found a younger age at first seizure after stroke (mean 45.41 years) but they have enrolled a wide spectrum of patients [11].

In our study Out of 150 cases, 56.33% were males and 44.67% were females showing. Males were seen more frequently as compared to females as seen in the previous international as well as regional reports [12,13]. However, Bhojoet *al.* have observed the same frequency of post-stroke seizures regarding gender in their series [14].

The incidence of seizures after stroke has been found to be related to stroke type. According to most studies, hemorrhagic strokes appear to be the most seizure provoking [10, 10-16]. Lancman et al. found that in patients who had a seizure after a stroke, 25% had a hemorrhagic stroke compared with 7% who had an ischemic stroke [17]. Other studies support these findings. Kilpatrick et al., [16] found an incidence of 15.4% for hemorrhagic strokes and 6.5% for ischemic strokes. We recruit 150 patients of age 16-80 years of either gender presenting with acute ischemic stroke to find the frequency of generalized seizures. Generalized

seizures are the second most reported seizure type observed after stroke [18,19].

However, other studies have found GTCSs as the most common seizure type [20]. We found the frequency of generalized seizures in patients presenting with acute ischemic stroke was found in 6.67%. Similar results were found by Bhojokhealani *et al* who found in their study that during the three-year period 1548 patients with stroke were admitted to the hospital. 28% had intracerebral hemorrhage and 72% had ischemic stroke. The frequency of generalized seizures after ischemic strokes was found to be 9%.<sup>14</sup> Kilpatrick *et al* in their study found 3.7% of transient ischemic attack had generalized seizures [16]. The occurrence of GTCSs in patients with ischemic stroke is unclear. Possible explanations are that the

GTCS may have actually been a secondarily generalized seizure in which the partial component was either not witnessed or brief enough to be missed; or the GTCS resulted from other precipitating factors such as metabolic abnormalities like electrolyte imbalance or hypoglycemia and was not a direct result of the coexistent stroke.

This study has a number of limitations including a relatively small number of patients with post-stroke seizures, which limits the ability to draw any causative associations among variables. Also this study lacks the EEG data, which might have helped us in identifying more seizures including non-convulsive seizures or status epilepticus; as well as the information regarding the antiepileptic treatment given to these subjects and their outcome. Therefore, larger-sized prospective studies are obligatory to improve the understanding of the post-stroke seizures and their impact on the person and society, translating into a better and evidence-based health care provision.

#### CONCLUSION:

Generalized seizures in patients presenting with acute ischemic stroke was found in 6.67% (10/150), was high in 61 to 70 years of age and was found to be significantly high in female as compare to male. The occurrences of seizures in a patient with stroke will often further impair quality of life. Indeed, the seizures, even if infrequent, may result in dependency, increased physical and psychological disability, and social restrictions. We recommend further multi center research focusing on timing of starting anticonvulsant therapy and the duration of treatment. Moreover, age specific outcome data and the effect of different strategies for its management and specific health related quality of life and health utility index measures relevant to post-stroke seizures are also required for

a better understanding and optimal management of this common clinical condition.

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