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A Study on Acute Symptomatic Seizures Following Stroke in a Tertiary Care Centre

Dr Shubha Subramanian[1], Dr V Chandramouleeswaran[2],Dr Kannan V[3], Dr Lakshmi Narasimhan[4]

1.Resident,Institute of Neurology,Madras Medical College,Chennai,India
2.Professor, Institute of Neurology,Madras Medical College,Chennai,India
3.Assistant Professor, Institute of Neurology,Madras Medical College,Chennai,India
4.Director, Institute of Neurology,Madras Medical College,Chennai,India
Corresponding author: Dr Shubha Subramanian1

Abstract :*AIM: To study the clinical and etiological profile of 130 consecutive patients with acute symptomatic seizures following stroke presenting to a tertiary care centre in south India. BACKGROUND: Post stroke seizures are defined as those at the beginning of or after stroke in a patient without prior onset of seizures. They are classified as acute symptomatic seizures(ASS) and Unprovoked seizures(US) depending on the time of occurrence with respect to the onset of stroke.The ILAE defines ASS if they occur within 7 days of stroke and US if seizures manifest after 1 week.Semiology could be focal seizures,focal with secondary generalization and generalized tonic clonic seizures. MATERIALS AND METHODS:130 consecutive patients with acute symptomatic seizures admitted in the Department of Neurology, Madras Medical College were included in the study after obtaining informed consent.After enrolment into the study based on the inclusion and exclusion criteria,a pre designed questionnaire was filled with information regarding demographic details,clinical features,type and size of stroke based on imaging and EEG patterns.RESULTS:Mean age of all patients was 52.4 years ranging from 32 years to 86 years.Out of 130 patients 93 were males and 37 were females .97 patients had seizures within the first 24 hours.86(66%) patients had ischemic stroke, out of which 65 were cortical and 21 were subcortical.Total of 33(26%) patients had ICH -14 had lobar haemorrhage and 19 had ganglionic bleed.11(8%) patients had cerebral infarct with hemorrhagic transformation. With regard to semiology of seizures 72(55%) had focal,40(31%) had focal with secondary generalisation,13(10%) had generalised tonic clonic seizures and 5(4%) had status epilepticus.EEG recordings were normal in 44(34%) patients,showedfocal slowing in 38(29%),diffuse slowing in 32(25%) and epileptiform discharges in 16(12%) patients.Out of the total 130 patients 52(40%) had single seizures and 78(60%) had multiple seizures.Only 4(3%) out of 130 patients had recurrent seizures. CONCLUSION: In our study patients with ischemic stroke presented with acute symptomatic seizures more commonly compared to ischemic stroke with hemorrhagic transformation and Intracerebral hemorrhage .Cortical site and larger size had more percentage of seizures compared to the subcortical site and smaller size in both ischemic and hemorrhagic stroke.Focal seizures with or without secondary generalization were found to be the commonest semiology. However there was no specific EEG pattern correlating to recurrence of seizures nor did it make any difference to the management of the patient.*

Keywords *- Acute symptomatic seizures, epileptogenesis, Post Stroke Seizures, Unprovoked seizures*

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I. Introduction

Stroke is one of the leading causes of death in the world and it is the most common cause of acute symptomatic seizures.Post stroke seizures are defined as those at the beginning of or after stroke in a patient without prior onset of seizures(1).They are classified as acute symptomatic seizures(ASS) and Unprovoked seizures(US) depending on the time of occurrence with respect to stroke onset.The ILAE defines ASS if they occur within 7 days of stroke and US if seizures manifest after 1 week.ASS was previously referred as early and US as late onset seizures(2).Semiology could be focal seizures,focal with secondary generalization, generalized tonic clonic seizures and Status Epilepticus. (10)

II. Materials And Methods:

130 consecutive patients with acute symptomatic seizures admitted in the Department of Neurology, Madras Medical College were included in the study after obtaining informed consent.Acute symptomatic seizures were defined as those patients with seizures at the onset of stroke or within one week of stroke.All patients with Cerebral Venous Sinus thrombosis,Sub arachnoid haemorrhage,CNS infections, tumours and surgeries,Traumatic brain injury,Previous history of epilepsy,metabolic and electrolyte abnormalities were excluded from the study.After enrolment into the study a pre designed questionnaire was filled with information regarding demographic details,clinicalfeatures,typeand size of stroke based on imaging and EEG patterns.

Depending on the semiology, seizures were classified into focal,focal with secondary generalisation,generalised tonic clonic seizures and status epilepticus.The timing of occurrence of seizures,any recurrence of seizures and deterioration in clinical condition after the seizure were carefully noted.2 or more than 2 seizures were considered multiple and recurrent seizures were defined as those occurring 2 weeks after the onset of initial seizure. CT Brain and EEG were performed in all the patients and repeated if necessary.Depending on the CT findings they were divided into infarction,infarction with hemorrhagic transformation and Intracerebral haemorrhage.Further infarctions were divided into cortical and subcortical based on site and small(<5 cm) and large(>5 cm) based on size.Similarly haemorrhage was divided as lobar and ganglionic bleed based on the site and small(<30 ml) and large hematoma(>30 ml) based on the volume.EEG findings were categorised as normal,focalslowing,diffuse slowing and epileptiform discharges like focal spikes,periodic lateralizing epileptiform discharges(PLEDS) and bilateral independent PLEDS.

EEG recordings were normal in 44(34%)patients,showed focal slowing in 38(29%),diffuse slowing in 32(25%) and epileptiform discharges in 16(12%)patients.Out of the total 130 patients 52(40%) had single seizures and 78(60%) had multiple seizures.Only 4(3%)out of 130 patients had recurrent seizures.

All 78 patients with multiple seizures were started on anti epileptics and 60 of them were discharged on anti epileptics.Out of 52 patients with single seizure only 18 were started on anti epileptics though remaining 34 did not develop seizures during the period of their hospital stay.All the patients on antiepileptics were on single antiepileptic agent.

III. Discussion

In our study total of 130 patients were included out of which 93(72%) were males and 37(28%) were females.Mean age of all patients was 52.4 years ranging from 32 years to 86 years.Majority of them had seizures within the first 24 hours which has been reiterated by many studies in the past.(3,4).Pathogenesis of acute symptomatic seizures after infarct have been attributed to ischemic hypoxia,high levels of excitotoxic neurotransmitters causing regional metabolic dysfunction,local ionic shifts lowering the seizure threshold(5) and global hypoperfusion.The mechanism of seizure initiation by haemorrhage is postulated to be due to products of blood metabolism like hemosiderin that may cause focal cerebral irritation.(6)Acute symptomatic seizures in infarct with hemorrhagic transformation is again due to blood extravasation causing cortical irritability(7)

According to Bladin et al cortical location is the most reliable risk factor for post stroke seizures.Even in our study 50 % of patients had cortical stroke compared of 16% of patients with subcorticalstroke.Analogous to cortical site in ischemic stroke,lobar site is considered to be the most epileptogenic region in hemorrhagic stroke.(8)Though in our study the number of patients having ganglionic bleed was more than patients with lobar haemorrhage,a detailed evaluation showed that these ganglionic bleed were larger in size with greater hematoma volume and more perilesionaledema extending into the cortex thereby causing acute symptomatic seizures.Another postulate is that ganglionic bleed is commoner compared to lobar haemorrhage. .Other than the site the next important risk factor was size of the lesion.49%(64)of stroke patients had infarctsize more than 5 cm and 25%(33) had less than 5cm size of lesion.In the same way 17%(22) of ICH patients had hematoma volume of more than 30 ml compared to9 %(11) of patients with less than 30 ml hematoma volume.Wang et al demonstrated positive association between large lesion size and acute symptomatic seizures.This has been reiterated in many studies previously.(9)In the same way larger hematoma volume was a risk factor as per dhanuka et al.(1)

In our study majority of the patients around 112 had focal seizures with or without secondary generalisation compared to 13 of generalised tonic clonic seizures and 5 status epilepticus. Giroud et al ina study of early onset seizures in 90 patients concluded that simple partial seizures were the most common type (61%)followed by secondarily generalized seizures(28%).(10)However in astudy by Susanna et al early seizures were most likely to be generalised(11).Holmes et al found that patients with focal spikes and PLEDS after stroke were prone to the development of seizures(12).In contrast focal and diffuse slowing,normal EEG were associated with relatively lower risks.In our studyEEG recordings were normal in 44(34%) patients,showed focal slowing in 38(29%),diffuse slowing in 32(25%) and epileptiform discharges in 16(12%) patients.Most of our patients with acute symptomatic seizures especially the ones with multiple seizures were started on

antiepileptics though according to the European stroke organisation guidelines there is no recommendation of starting patients on AED prophylaxis(both primary and secondary) in acute symptomatic seizures due to its low recurrence.

IV. Results:

Mean age of all patients was 52.4 years ranging from 32 years to 86 years.Out of 130 patients 93(72%) were males and 37(28%) were females .97(75%) patients had seizures within the first 24 hours.

V. Figures And Tables

Table.1

Stroke type and Site	
Ischemic stroke	86(66%)
Cortical	65(50%)
Subcortical	21(16%)
Hemorrhagic stroke	33(26%)
Cortical/Lobar	14(11%)
Ganglionic region	19(15%)
Ischemic stroke with hemorrhagic transformation(HT)	11(8%)

Percentage distribution depending on stroke type and site

Table.2

Ischemic stroke&HT	97(74%)
Small(<5 cm)	33(25%)
Large(>5 cm)	64(49%)
Hemorrhagic stroke	33(26%)
<30ml hematoma	11(9%)
>30ml hematoma	22(17%)

Distribution as per Size of stroke following imaging

Table.3

Focal seizures	72(55%)
Focal seizures with secondary generalisation	40(31%)
GTCS	13(10%)
Status Epilepticus	5(4%)

Percentage distribution based on Semiology of seizures

VI. Conclusion

In our study patients with ischemic stroke presented with acute symptomatic seizures more commonly compared to ischemic stroke with hemorrhagic transformation and Intracerebralhemorrhage .In infarcts, Cortical siteand larger size had more percentage of seizures compared to the subcortical site and smaller size.Similarly in ICH lobar site and larger hematoma volume had more percentage of acute symptomatic seizures compared to ganglionic bleed and smaller hematoma volume.Focal seizures with or without secondary generalization were found to be the commonest semiology. However there was no specific EEG pattern correlating to recurrence of seizures nor did it make any difference to the management of the patient.

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