



Original Article

Clinical Profile, Aetiology, and Short Term Outcome of Convulsive Status Epilepticus in Children in Eastern India

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Abstract

The study was done to assess the clinical profile, aetiology, neuroimaging pattern, short-term outcome and possible risk factors of status epilepticus (SE). A prospective study was carried out on convulsive status epilepticus patients at Pediatric Medicine Department from February 2011 to January 2012. 40 children within age group 6 months to 12 years were included in the study. They were studied for clinical presentation, laboratory findings, efficacy of management and short-term outcome. Among 40 patients of SE aged between 6 months to 12 years, maximum (80%) were <5 yrs of age. GTCS (generalized tonic-clonic seizure) was the most common (75%) type of seizure. SE with fever was more common in <2 yrs of age (71.5%). The most common cause of SE in this study was acute symptomatic (50%) and meningitis was leading cause. Cerebral oedema (27.2%) was the most common abnormality found in neuroimaging. Seizure termination was done by Lorazepam in 60% and by diazepam and phenytoin combination in 35% patients. Age <2 years (p-value 0.04), seizure duration >45 minutes (p 0.02) acute symptomatic etiology (p 0.04) were associated with poor outcome. We conclude that rapid termination of seizure and increase immunization coverage are important steps to prevent mortality and morbidity in SE.

Keywords: Status epilepticus, children, aetiology, short term outcome.

INTRODUCTION

Status epilepticus (SE) is a major medical and neurological emergency. There are as many types of SE as of seizures. Among them generalised tonic-clonic seizure is most common type presented with status epilepticus. SE is supposed to

result from failure of normal mechanisms that terminate an isolated seizure. The ILAE defines SE as “a seizure that shows no clinical signs of arresting after a duration encompassing the great majority of seizures of that type in most patients or recurrent seizures without interictal resumption

of baseline central nervous system function^(1,2). It is more frequent in children, following acute central nervous system infections, hypoxia, brain damage and sudden withdrawal of antiepileptic drugs. It is estimated that 1.3% to 16% of all patients with epilepsy will develop SE at some point in their lives.⁽³⁾

Outcome of SE in children is favourable in most cases, but mortality and morbidity rates are still high. Mortality is particularly high in central nervous system infection and acute brain injury. Morbidity secondary to childhood SE includes the development of focal neurological deficits, cognitive impairment and behavioural problems. Several studies based on clinical profile and prognostic factors were done on SE in developed and developing countries but paucity of data from eastern part of India.^(4,5)

In this study we try to assess the pattern of clinical presentation of convulsive status epilepticus in children (6months-12 years) and understand the clinical profile and neuroimaging abnormality, determination of etiology and seizure type, evaluate the efficacy of management, risk factors and short-term outcome.

METHODOLOGY

The study was a open prospective study. It was done from February 2011 to January 2012 on all the cases of convulsive status epilepticus in pediatric age (6months-12 years) group attending the emergency unit of the Department of Pediatrics. Patients with seizure duration less than 30 minutes, patients with age <6 month and >12 years and those patients in whom seizure duration could not be documented with or without loss of consciousness were excluded from the study. Detailed history including past medical & drug history repeated clinical examinations findings were noted. Complete blood count, serum urea, creatinine, Na, Ca, Mg, blood sugar were send. CSF analysis, neuro imaging EEG. were done where indicated. Mantoux test, chest x-ray, echocardiography were done on case basis. All patients were given standard care in PICU. Short-

term outcome at 4 weeks were noted in the form of mortality, neuro deficit and no sequel.

For EEG study- RMS Medicare Analog EEG Machine, Chandigarh, for CT Scan Study: 4 Slice multi detector ASTION 4, for MRI Study: MRI Machine (1.5 Tesla GE Signa) were used. Fisher-exact test was used for statistical analysis.

RESULTS

40 patients were included in the study. 21(51.2%) were below 2 years of age, 11(27.5%) between 2 to 5 years and 8 (20%) were above 5 years of age. 24 (60%) were male and rest 40 % were female. Most common type seizure was GTCS (generalized tonic-clonic seizure).

19 (47.2%) cases were associated with fever in rests 21(52.5%) cases precipitating factors were withdrawal of anti epileptic drugs in 5 cases, hypocalcemia in 2 cases, uremia and hypertension in 1 case each. Fever was most common in < 2 years of age as shown in Table 2.

Among 40 patients, 27(67.5%) had no history of prior seizure. Most common cause of recurrent seizure was epilepsy in 5 cases, cerebral palsy in 3 cases, neuro degenerative disease in 2 cases, Sturge-Weber syndrome in 1 case, Rasmussen's encephalitis in 1 case, Subacute Sclerosing Panencephalitis in 1 case. Seizure lasted for more than 45 minutes was in 22 (55%) cases.

Etiology of SE was tabulated in Table no 3 which showed acute symptomatic was the most common cause followed by seizure disorder.

In cases of acute symptomatic pyogenic meningitis was the leading cause 5 (12.5%) followed by tubercular meningitis 4 (10%) cases. 2 Brain abscess, viral encephalitis, cerebro vascular accident, hypocalcemia in each cases; 1 cerebral malaria, uremia and hypertensive encephalopathy in each case.

Among 40 patients, seizure termination was done by lorazepam in 24 (60%) patients and by diazepam and phenytoin combination in 14(35%) patients. 2 (5%) cases required more than 2 anti convulsant. Outcome at 4 weeks depicted in Table no 4.

CT scan /MRI of brain were done in 33 patients cerebral edema being the most common findings 13 (32.5%) followed by cerebral atrophy in 6 (18.1%) patients .Imaging was normal in 4 (10 %) cases.EEG was done in 34 cases and among them 30 (88.2%) cases were abnormal. We analysed risk factors for short-term outcome. Seizure duration > 45 minutes (p-value 0.02),acute symptomatic seizure (p-value 0.04) and age <2 years (p-value 0.04) were associated significantly with more mortality and morbidity

Table1 Types of seizure

Type	Number(n)	Percentage (%)
GTCS	30	75
Partial	8	20
Myoclonus	2	5
Total	40	100

Table 2 Distribution of fever in different age group

Age (years)	Fever present (n-19)	Fever abscent (n-21)	Total (n-40)
<2	15(71.5%)	6(28.5%)	21(100%)
2-5	3(27.2%)	8(72.8%)	11(100%)
>5	1(12.5%)	7(87.5%)	8(100%)

Table 3 Etiology of acute symptomatic seizure

Etiology	Number	Percentage
Acute symptomatic	20	50
Seizure disorder	13	32.5
Idiopathic	5	12.5
Febrile seizure	2	5

Table -4 Short term outcome of patients

Outcome	Number	Percentage %
Mortality	6	15
Morbidity	6	15
No neurodeficit	28	70

DISCUSSION

We have studied 40 patients of SE. Out of them majority (80%) were below 5 years. Gulati et al., in their study found that 56% of patients were five years or younger. ⁽⁵⁾ Mritunjay Kumar et al. in their study from Patna found incidence 43%. ⁽⁶⁾ Incidence may be high due to increased reporting, rapid referral and different geographical area. Probably, mechanisms for control of seizure

activity are fragile in younger children and may get disrupted with minimal abnormalities in neurofunction. That is why younger age group are weak victim .Male female ratio in our study was 1.5:1. Mritunjay Kumar et al. in their study found male-female ratio 1.5 :1. ⁽⁶⁾ Murthy et al., in their study found that male to female ratio was 1.3:1 ⁽⁷⁾. Although there is no definite causal relationship in literature for this male preponderance.

In this study most common type of seizure presented with status epilepticus was generalised tonic-clonic type 75%, followed by partial 25%. This picture tally with different Indian studies ^(5,7,8) and also western studies ^(9,10). But DeLorenzo RJ et al study from Virginia in 1996 reported incidences of partial seizure presented with status epilepticus was much higher 64%.This inconsistency may be due to different study population as that study was mainly adolescence based. ⁽⁴⁾ In our study twenty-seven patients (67.5%) presented as SE without prior history of seizures. The result was quite similar with the Indian study done by S Gulati in 2005 where the percentage of patients presented with SE without prior history of seizures was 53.5 ⁽⁵⁾.

The etiological profile of SE in developing countries is distinctly different from developed countries. In this study, acute symptomatic etiology accounted for 50 % of the cases. Similar high frequency of acute symptomatic etiology was reported in the hospital-based studies in developing countries ^(5,6,7,11) Interestingly on an another study done by Kang DC et al in 2005 revealed different picture, where idiopathic etiology of SE was 40.7%, with decreasing order epilepsy was responsible in 29.1%cases, and acute symptomatic etiology in 13.3% cases. ⁽¹⁰⁾ This difference in the result is probably due to better health status of children of developed countries and higher rates of infection in developing countries. Of the acute symptomatic etiology, cerebrovascular disease is the predominant cause in developed countries ^(12,13) whereas in developing countries CNS infections accounted

for 28–67% of etiological spectrum^(14,15) and this was much more so in the children⁽¹⁴⁾. In this study 71.5% patients aged less than 2 years were presented status epilepticus with fever. From this data we made inference that status epilepticus with fever was more common in below 2 years of age. This above observation is supported by DeLorenzo et al study where the presentation of SE with fever in age group less than 2 years was 80%.⁽⁴⁾

We used lorazepam successfully as first line drug for termination of status epilepticus in 60% cases and diazepam and phenytoin combination in 35% cases. More than 2 anticonvulsants including midazolam infusion were required in 5% children. Recent studies from India and western countries showed lorazepam was better than diazepam and phenytoin combination in terms of efficacy and side effects.⁽¹⁶⁾ In this study most common abnormality detected was in neuro imaging cerebral oedema 27.2% which matches with the finding in two other Indian study like J Kalita⁽⁸⁾ and S. Gulati study where average incidence of cerebral oedema was around 30%.⁽⁵⁾ EEG was done in 34 patients (85%). Most of the EEG (88.2%) revealed abnormal findings which was more or less similar with the previous studies done by S. Gulati et al. where the figure was 92%⁽⁵⁾

Immediate mortality in this study was 15%, this includes the mortality that occurred during seizure activity and hospital course. This picture was quite similar with the mortality rate of SE in J Kalita et al. study in 2010 where the percentage was 14%.⁽⁸⁾ Though Gulati et al. in their study found 30% mortality. That study was done almost 15 years back. Improvement in management decreased mortality. This study we found a significant relationship ($p=0.04$) in respect to outcome of SE in between younger age <2 years and above 2 years of age. In a study by Gulati et al where the reference age group taken was 36 months (3 years) also reported that higher mortality of SE in children <36 months of age.⁽⁵⁾ Sadaranjani M et al in 2008 studied 388 cases of

SE in a rural hospital of Kenya found that higher mortality was associated with younger age group (less than 12 months).⁽¹⁷⁾ But in Kang DC et al study in 2005 in developed country did not find any relationship in between the age group and the outcome.⁽¹⁰⁾

The primary aim of management was to control and abort SE as the duration of seizure activity is directly proportional to immediate mortality and later morbidity.⁽⁶⁾ S Gulati et al using SE lasting <45 minutes as a reference frame found that longer duration associated with higher mortality.⁽⁵⁾ DeLorenzo et al also showed that poor outcome of SE when the duration of seizure activity was >1hr in comparison to shorter duration of seizure activity.⁽⁴⁾ We used 45 minutes and above as a time duration for comparison of outcome of SE. Our observation was that the patients who experienced seizure activity more than 45 minutes had more mortality ($p=0.02$) than seizure activity <45 minutes. In this study we found significance ($p=0.045$) between the mortality and acute symptomatic as a etiology of SE. This result was supported by the result of the study done by Sadaranjani M et al where they showed symptomatic etiology was associated with poor outcome of SE.⁽⁹⁾ In India Murthy JM and others also found significant relationship with mortality and acute symptomatic etiology.⁽⁷⁾

CONCLUSION

We conclude that there is a need to terminate seizure as early as possible. As infective etiology still very high strengthening of immunization programme is urgently needed.

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