



**CLINICAL PROFILE OF CHILDREN PRESENTING WITH CONVULSIVE STATUS EPILEPTICUS
AT A TERTIARY CARE HOSPITAL IN SOUTHERN INDIA**

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ABSTRACT

Convulsive status epilepticus (CSE) is a common pediatric neurological medical emergency associated with significant morbidity and mortality. The current study aimed to study the relation of age, sex, etiology and outcome in CSE. A total of 94 subjects aged 1 month and above with CSE were included for the present study. Results were analyzed using Chi-Square test. Relation between age and CSE revealed that majority belonged to 1- 5 year age group. Majority of CSE were of the acute symptomatic category (37-50%). A duration of >12 hours of CSE was seen in acute symptomatic, progressive symptomatic and febrile group. Mortality was found to be less in all groups. Outcome in the acute symptomatic, febrile and idiopathic groups were good as compared to remote and progressive symptomatic groups. CSE had a male preponderance and majority belonged to 1-5 years and mortality was more in the acute symptomatic group.

KEY WORDS: Status epilepticus, pediatric, seizure, mortality



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INTRODUCTION

Convulsive status epilepticus (CSE) is a common pediatric neurological medical emergency associated with significant morbidity and mortality. Status Epilepticus (SE) is particularly common during the first 2 years of life. The factors that suggest a poorer outcome in terms of seizures, cognition, and behaviour include the presence of multiple seizure types, an additional, particularly cognitive disability, the presence of identifiable cerebral pathology, high rate of seizures, early age of onset, poor response to antiepileptic drugs, and the occurrence of CSE¹. Seventy five to 85% cases occur before the age of 5 years². The incidence of SE varies from 3.7% to 9.1% as per Western literature^{3,4,5} and in the Indian subcontinent is not clearly known. Study of Gulati Sheffaliet al⁶ however has showed 0.6% cases of SE, out of which 56% patients were less than 5 years of age. In the 1970s, studies have shown that the mortality rate was around 3 to 11%^{2, 7} whereas in the latest studies the mortality figures have declined towards zero^{8, 9,10}. This might result partly from a change in the definition of status epilepticus where duration of 30 minutes is currently applied, whereas in the 1970s duration of 1 hour - or even 2 hours - was used. Lower mortality and morbidity may also be due to more aggressive treatment protocols¹¹. The current study is aimed to study the profile of local south Indian children presenting with CSE and to study the common etiological factors and outcome in terms of mortality and morbidity of convulsive status epilepticus.

MATERIALS & METHODS

(i) Subjects

A total of 94 children (54 males, 40 females) aged between one month and 18 years with CSE were included. This included 53 retrospective cases, 6 retrospective with prospective follow up and 35 prospective cases at the Department of Pediatrics, Kasturba Hospital, Manipal, India. The study was conducted with the approval of Institutional Ethics

Committee. All patients with CSE and with sequelae at discharge, irrespective of whether they turned up for follow up at or after 3 months, or those who died during the hospital stay were included in the study. The patients were considered normal if they had no sequelae during follow up and as abnormal if they had sequelae on examination at follow up. Neonates were excluded because of different nature of neonatal seizure in respect to etiology and outcome. Children with nonconvulsive status epilepticus were excluded because of difficulty in determining the duration of seizure. Children with CSE who were normal at discharge and who did not turn up for follow up after 3 months were excluded.

(ii) Preparation of profile of CSE

Data were obtained on preformed questionnaire by taking a history from the most reliable source and by examination of the patient during hospital stay and follow up. The patient history, clinical presentation, complications, investigations and the final outcome were recorded in a clinical proforma. For retrospective cases data were from the inpatient and out patient files of the patients. Outcome was studied in terms of mortality and survivors. Mortality was defined as death occurring in the hospital during the course of treatment irrespective of whether the seizure was controlled or not irrespective of underlying etiology.

(iii) Statistical analysis

Results were analyzed using Chi-Square test. P value <0.05 was considered to be statistically significant

RESULTS

Among 94 children, 54 (57.4%) were males and 40 (42.5%) were females. There was male preponderance in the study group. Primary generalized seizure was the most common type of seizures, followed by Complex partial seizure. Eight each in secondary generalized & combined seizure and five children had simple partial seizures (Table I).

Table I
Type of seizure

Type of seizure	Primary seizure(PG)	Generalized	Secondary Seizure(SG)	Generalized	Complex Seizure(CP)	Partial	Simple Seizure(PS)	Partial	Combined seizure(CS)
No. of patients(n)	60		8		13		5		8
%	63.8		8.5		13.8		5.3		8.5

Majority of the children with status epilepticus belonged to the acute symptomatic group followed by idiopathic group (Table II).

Table II
Etiology of status epilepticus

Group	No. of patients (n)	%
Acute Symptomatic (A)	39	41.4
Remote Symptomatic (B)	7	7.4
Progressive Symptomatic (C)	14	14.8
Febrile (D)	9	9.5
Idiopathic (E)	25	26.5

Majority of children who had status epilepticus lasting >24 hours belonged to the acute symptomatic and progressive symptomatic group. A similar picture was also observed in remote symptomatic and Idiopathic group. In the febrile group only 22.2% of children had status epilepticus lasting > 24 hours (Table III).

Table III
Duration of seizures Vs Etiology

Etiology	No. (%) of children (N=94)	
	Total	Status > 24 hours
Acute symptomatic	39	30 (76.9%)
Remote symptomatic	7	4 (57.9%)
Progressive symptomatic	14	12 (85.7%)
Febrile	9	2 (22.2%)
Idiopathic	25	16 (64%)

Mortality was less among all the age groups. There were more number of survivors in the 1-5yr age group. A similar trend was also seen in the other groups indicating that mortality was less irrespective of age (Table IV).

Table IV
Age of children with status epilepticus vs Mortality

Age	n =73	Survival	Mortality
< 1 year	19	13(68.4%)	6(31.5%)
1 – 5 years	34	31(91.1%)	3(8.8%)
6 – 10 years	11	9(81.8%)	2(18.1%)
> 10 years	9	5(55.5%)	4(44.4%)

$\chi^2 = 7.465$, ($p=0.059$), Not Significant

Survival was better irrespective of etiology. Survival was 100% in the remote symptomatic and febrile group. In the acute symptomatic group it was 60%, Progressive symptomatic group 90% and in the idiopathic group 89.4% (Table V).

Table V
Etiology of status epilepticus vs Mortality

Group	n = 73	Survival	Mortality
Acute Symptomatic(A)	30	18(60%)	12(40%)
Remote Symptomatic(B)	6	6(100%)	0(0%)
Progressive Symptomatic(C)	10	9(90%)	1(10%)
Febrile(D)	8	8(100%)	0(0%)
Idiopathic(E)	19	17(89.4%)	2(10.5%)

$\chi^2 = 12.42$, ($p=0.014$), Significant

Duration was not predictor of mortality. This correlation was not statistically significant (Table VI).

Table VI
Duration of seizures vs Mortality

Duration of seizure	n = 73	Survival	Mortality
30 minutes – 2 hours	23	21 (91.3%)	2 (8.6%)
3 hours – 12 hours	27	22 (81.4%)	5 (18.5%)
13 hours – 24 hours	3	1 (33.3%)	2 (66.6%)
> 24 hours	20	14 (70%)	6 (30%)

$\chi^2 = 7.05$, ($p=0.07$), Not Significant

Outcome in the acute symptomatic group 12 (66.6%), febrile 7 (87.5%) and idiopathic 11 (64.7%) was good as compared to the remote 2 (33.3%) and progressive symptomatic group 1 (11.1%) (Table VII).

Table VII
Etiology vs Outcome among survivors at Follow-up

Group	No. of patients(n=58)	Normal	Abnormal
Acute Symptomatic(A)	18	12(66.6%)	6(33.3%)
Remote Symptomatic(B)	6	2(33.3%)	4(66.6%)
Progressive Symptomatic(C)	9	1(11.1%)	8(88.8%)
Febrile(D)	8	7(87.5%)	1(12.5%)
Idiopathic(E)	17	11(64.7%)	6(35.3%)

$\chi^2 = 13.229$, ($p=0.01$), **Highly Significant**

There was a statistical significance between the type of seizure and outcome among the survivors at follow-up(Table VIII).

Table VIII
Seizure Type vs Outcome among survivors at Follow-up

Seizure Type	n=58	Normal	Abnormal
Primary Generalized Seizures(SG)	33	19(57.5%)	14(42.4%)
Secondary Generalized Seizure(PG)	5	2(40%)	3(60%)
Complex Partial Seizure(CP)	10	5(50%)	5(50%)
Simple Partial Seizure(SPS)	4	2(50%)	2(50%)
Combined Seizure	6	3(50%)	3(50%)

$\chi^2 = 11.875$, ($p=0.018$), **Significant**

Least number of anti-epileptic drugs used to control seizure had better outcome. When upto 3 drugs were used to control seizure mortality was 10% which increased to 33.3% upto 6 drugs and 50% when more than 6 drugs were used. Correlation among various groups with outcome was statistically very highly significant(Table IX).

Table IX
Number of Antiepileptic drugs used vs Outcome among survivors at follow up

No. of antiepileptic drugs used	n = 73	Survived (Normal)	Survived (Abnormal)	Mortality
1 - 3	46	29 (63%)	12 (26%)	5 (10%)
4 - 6	21	3 (14.2%)	11 (52.3%)	7 (33.3%)
> 6	6	0 (0%)	3 (50%)	3 (50%)

$\chi^2 = 20.164$, ($p=0.0005$), **Very Highly Significant**

DISCUSSION

In the present study, group classification is slightly different. Chronic encephalopathy had been divided into remote symptomatic and progressive symptomatic. Febrile and Idiopathic groups were separate. This study concurs with the observations made by Phillips and Shanahan¹² which states that 41.4% belonged to the acute symptomatic group. However, only a small proportion of children, about 9.5% presented with SE in the febrile group as against 28 % & 29% in studies by Aicardi and Chevrie² and Phillips and Shanahan¹². In the present study males outnumbered the females with ratio M:F of 1.35:1. Aicardi et al² reported male to female ratio of 1.06:1. In a prospective, population – based epidemiologic study of status epilepticus by De Lorenzo et al (1991)¹³ male to female ratio was found to be 1.22:1. In the present study, the commonest type of seizure observed was primary generalized (63.8%), followed by complex partial seizure (13.8%). Similar results of preponderance of generalized seizure were found in Maytal et al⁸ study (68.9%) and Aicardi et al² study (51%). In the present study majority of the children 76.5% were found in first five years of age group and acute symptomatic causes predominated in all the age groups. The above findings are similar to the studies done earlier which showed peak incidence was in the first few years of life with 21% cases occurring in the first year

of life and 64% in the first five years as per Maytal et al⁸ study. Also in the Aicardi et al² study symptomatic status had its maximum frequency in the very young. In Sheffali et al⁶ study, peak incidence was found in <5 years age group (56%). Reason for this predominance of status epilepticus in younger children is not known. Probably, the mechanism for control of seizure activity is fragile in younger children and may get disrupted with minimal abnormalities in neuro function. In the present study, prolonged status epilepticus (>2hours) was observed in acute symptomatic (76.9%) and progressive symptomatic (85.7%) group and also in remote symptomatic (57%) and idiopathic (64%) group. But in patients with febrile seizures prolonged seizures were observed in only 22.2%. This concurs with the findings of Maytal et al⁸, who reported 46% of subjects with acute symptomatic etiology and status epilepticus of >1hour and only 14% of patients with febrile convulsions. Mortality in the present study was 15.9%, this includes the mortality that occurred during seizure activity and hospital course. Aicardi et al² in their study found mortality of 11.4%. Maytal et al⁸ and Phillips et al¹² in their studies reported mortality of 3.6% and 6.7% respectively. In a study done in India by Sheffali et al⁶ in 2000 of 30 children with status epilepticus admitted to PICU found mortality of 30%. Factors responsible for increased mortality were delayed referral from the primary center and refractory status. Similarly other risk factors associated were

mortality sepsis, ARDS, primary disease and metabolic encephalopathy during the treatment. In all these studies long term mortality has not been studied. Logroscino et al¹⁴ found cumulative mortality among 30 day survivor was 43% in their study of long term mortality after a first episode of status epilepticus in 1985. In the present study acute symptomatic etiology was the most common cause of mortality contributing to 40%, followed by Idiopathic (10.5%) and progressive symptomatic (10%) with no mortality in remote symptomatic and febrile group and these results were statistically significant showing etiology being one of the important determinant for mortality. Similar results were found in Maytal et al⁸ and Phillips et al¹² study showing 71.4% and 84.6% deaths contributed by an acute symptomatic group. In Logroscino et al¹⁵ study in 1996, acute symptomatic cause contributing to mortality was 89.4%. Correlation of mortality with duration in different studies is variable. In the present study duration was not statistically significant when correlated with mortality. Similar results were concluded in Logroscino and Hesdorffer¹⁵ study in 1996. In the present study neurological sequelae were more in progressive symptomatic group (88.8%) followed by remote symptomatic (66.6%), Idiopathic group (35.3%) and least in febrile etiology group (12.5%) and these results were statistically significant showing that etiology is most important defining variable for outcome. In Maytalet al⁸ study more adverse outcome was in a

progressive encephalopathy group followed by acute symptomatic group. In the present study seizure type was significantly correlated with outcome. Worse outcome was found in secondary generalized group. In present study, first line drug were used in 68%, second line in 26.5% and in remaining 5.3% intravenous anaesthetic drugs were used. In the present study, survival was found to be 90% with 10% mortality when only 3 drugs were used to control seizure. When number of drugs used upto 6 to control seizure survival dropped to 66.6% with 33.3% mortality. And, when more than 6 antiepileptic drugs were used, mortality was found to be 50% with 100% neurological sequelae in survival group.

CONCLUSION

Relationship between age and outcome was not statistically significant, however sequelae and mortality was more in children of more than 10 years of age. Relationship between etiology and outcome was statistically significant, and sequelae more common in progressive symptomatic group. Majority of seizure type was primary generalized and sequelae common in children with secondary generalized seizures. In the current study there was no significant association between duration of seizure and outcome in terms of sequelae and mortality

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