Original Research Article

A study of clinical profile and etiology of status epilepticus in children at tertiary health care centre

Manojkumar G Patil[1], Shradha Salunkhe[2*], Sneha T[3], Sampada Tambolkar[4], Sharad Agarkhedkar[5]

[1,2]Assistant Professor, [3]Sr. Resident, [4]Associate Professor, [5]Professor and HOD, Department of Pediatrics, Dr D Y Patil Medical College, Hospital and Research Center, & Dr. D Y Patil Vidyapeeth, Pimpri, Pune, Maharashtra, INDIA.
Email: salunkheshradha@gmail.com

Abstract

Background: Status epilepticus happens when a seizure continues for a long time (more than half an hour), or when a child has several seizures without time to recover between them. Rapid treatment for status epilepticus is important, since the longer it continues, the harder it is to stop. **Aim and objective:** To study etiology and clinical profile of status epilepticus in children. **Methodology:** In this prospective study 40 patients (2months to 14 years) admitted in PICU were studied for status epilepticus. Data collected for demographic character, detailed history and clinical examination. Patient underwent all required investigations. Standard treatment protocol was followed by paediatric intensivist. **Results and Discussion:** Younger age group was the most commonly affected (80%) with male predominance. Acute symptomatic was the commonest (n=18) of all the etiologies, followed by febrile (n=8) and idiopathic (n=8).
Key Words: epilepticus in children.

***Address for Correspondence:**
Dr. Shradha Salunkhe, Assistant Professor, Department of Pediatrics, Dr D Y Patil Medical College, Hospital and Research Center, & Dr. D Y Patil Vidyapeeth, Pimpri, Pune, Maharashtra, INDIA.
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INTRODUCTION

Epilepsy is derived from the Greek verb meaning, "To seize upon" and is synonymous with seizure disorders.. For epidemiologic classification purpose, epilepsy is considered to be present when two or more unprovoked seizures occur at an interval greater than 24hrs apart. In 1981, international league against epilepsy defined STATUS EPILEPTICUS (SE) as seizure activity, either continuous or episodic without complete recovery of consciousness that lasts for at least 30 minutes.[1] Status epilepticus is a common paediatric neurological emergency that requires immediate and rigorous management. It poses a therapeutic challenge to the treating physician. Status epilepticus presents in a multitude of forms, dependent on etiology and patient age. (myoclonic, tonic, subtle, tonic-clonic, absence, complex partial etc.). The incidence of status epilepticus varies from 3.1- 9.7% [2,3,4] as per western literature. The incidence of status epilepticus in India is unknown. It is estimated that 1.3- 16 %[5,6] of all patients with epilepsy will develop status epilepticus at some point in their lives. A better understanding of etiology, clinical status at time of admission and outcome is essential to help improve the approach and to plan rational management of status epilepticus. Keeping the above things in mind, this study was conducted to determine the etiology, course, outcome of status epilepticus in children at a tertiary care centre of a teaching hospital.

MATERIAL AND METHODS

This prospective observational study was conducted over a period of one year in a 10 bedded level III paediatric intensive care unit with 500 to 600 admissions per year which are supervised round the clock by a paediatric intensivist in addition to all other super-specialists including neurologists. This study was approved by

institutional ethics committee, written informed consent was obtained from parents of the subjects in their own language before enrolling any patient in the study. There were 620 patients admitted to PICU during the study period out of which 40 met the definition of status epilepticus.

Inclusion Criteria: Patients aged > 2 months to 14 years, fulfilling definition of status epilepticus as per international classification of epileptic seizure.

Exclusion Criteria: Seizure activity lasting for less than 30 minutes, Patients aged less than 2 months or more than 14 years, Patients, where duration of seizure activity could not be documented with or without regaining consciousness or patients whose case records had no time specification. Data collected on admission was Demographic (Name, age, sex, detailed address, phone numbers, medical record number, admission date in PICU and discharge date or expired date).History details of origin duration progress of seizures, onset and time of seizures, duration and type of seizure, type of treatment received before arrival, referred from hospital or self, milestones i.e. normal or abnormal, family history of convulsions, birth history. Clinical data Heart rate, Respiratory pattern, Blood pressure (systolic, Diastolic), temperature, Capillary refill time, Glasgow coma scale, Pupillary size and reaction, detail neurological examination. Neurological examination done and data collected regarding Duration to control seizure, detailed neurological examination including brain stem reflexes. The examination of the brain stem was carried out with the possibility of uncal or central herniation in mind. The posture, response to pain, tone, peripheral reflexes, and plantar response as well as the oculocephalic (doll's eye) reflexes, pupil size and response to light, and respiratory pattern was examined. In suspicion of a cervical injury, or any doubt over the findings, If it is not possible to perform oculocephalic testing, oculovestibular or caloric testing was undertaken using ice cold water. Investigation carried out in these patients were complete blood count, Urine Routine, CSF, serum calcium, serum magnesium, random blood sugar, chest x ray, serum electrolytes, EEG, MRI/CT, liver function tests, renal function tests and EEG. Patients were monitored by Heart rate, respiratory rate, capillary refill time, blood pressure, GCS. Standardised treatment protocols were implemented under supervision of paediatric intensivist. Etiology of status epilepticus was determined on basis of history, clinical examination and relevant laboratory investigations. The entire statistical analysis was performed using Statistical Package for Social Sciences (SPSS version 11.5, Inc. Chicago, USA) for MS windows.

RESULTS

There were 620 admissions in the pediatric intensive care unit during this study period which was conducted over one year. Out of these, 40 patients had status epilepticus as per the definition of international league of epilepsy. Of all these patients, those who came directly to the hospital, received initial treatment in pediatric emergency room of our hospital.

Table 1: Demographic data of patients

PICU admissions during recruitment period	620
Total patients with SE	40 (6.5%)
Self referral out of patients with SE	11 (27.5%)
Referred by other hospitals after providing initial treatment	29 (72.5%)
AGE less than 5 years	32 (80%)
More than 5 years	8 (20 %)
SEX MALE	25 (62.5 %)
FEMALE	15 (37.5 %)
RESIDENCE RURAL	24 (60%)
URBAN	16(40%)

As shown in Table I, of 620 admissions, 6.5% met the definition of status epilepticus. Majority of the patients i.e 72.5% were referred from other primary or secondary care level hospitals or pediatrician`s clinics. There were 80% children below 5 years of age and only 20% above 5 years and males (62.5%) more than females (37.5%). 24 patients (60%) were from rural area and 16 (40%) patients were from urban area. As shown in fig 1, out of the 40 patients, 30 (75%) patients survived and 10 (25%) patients expired.

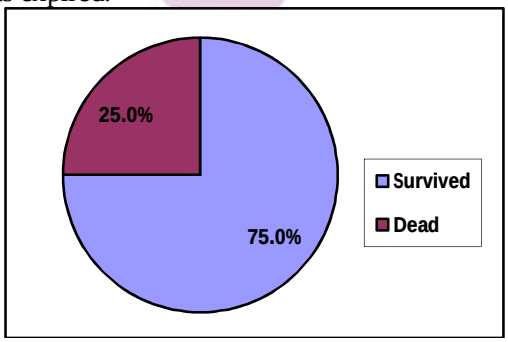

Figure 1:

Table 2: Table showing duration of status epilepticus in survivors vs non-survivors (in hours) before admission to PICU

Parameters Duration of status (hours)	Outcome: Survivors N (%)	Outcome: Non-survivors N (%)	P-value
<1	18 (60.0)	2 (20.0)	0.047
1-2	6 (20.0)	7 (70.0)	
2-3	3 (10.0)	0	
3-4	1 (3.3)	0	
4-24	2 (6.7)	1 (10.0)	
Total	**30 (75%)**	**10 (25%)**	

As shown in Table II, out of the 30 survived: 60% of patients had status for less than 1 hour, 20% patients had between 1-2 hours, 10% patients had between 2-3 hours, 3.3% patients had between 3-4 hours and 6.7% patients had between 4-24 hours. Out of the non survivors, 20% of patients had less than 1 hour, 70% of patients had between 1-2 hours and 10% of patients had between 4-24 hours. Thus, patients who survived had significantly shorter duration of seizures (p 0.047)

TABLE III Duration required to control seizures (minutes).

Table 3:

Parameters	Outcome: Survivors N (%)	Outcome: Non-survivors N (%)	P-value
Time to control seizures (mins)			
<15	11 (36.7)	1 (10.0)	0.000
15-30	17 (56.7)	0	
30-45	2 (6.7)	1 (10.0)	
45-60	0	6 (60.0)	
≥60	0	2 (20.0)	
Total	**30 (75%)**	**10 (25%)**	

Out of the 30 survivors, 36.7% patients stopped convulsing in less than 15 minutes, 56.7% of patients in 15-30 minutes and 6.7% of patients in 30-45 minutes. Out of the 10 who died, only 1 stopped convulsing in less than 15 minutes, 6 took more than 45min and 2 more than one hour. Thus as shown in Table III, the seizures were controlled significantly early in survivors as compared to non-survivors (p 0.000).

AETIOLOGY OF STATUS BETWEEN SURVIVORS AND NON SURVIVORS

Table 4: Distribution of patients according to aetiology of status epilepticus

Parameters	Outcome: Survivors N (%)	Outcome: Non-survivors N (%)	P-value
Aeitology			
Acute Symptomatic	10 (33.3)	8 (80.0)	0.081
Febrile	8 (26.7)	0	
Idiopathic	6 (20.0)	2 (20.0)	
Progressive encephalopathy	1 (3.3)	0	
Symptomatic	5 (16.7)	0	
Total	**30 (75%)**	**10 (25%)**	

As per the aetiology, out of the 30 survivors, 33.3% of patients were from acute symptomatic group, 26.7% of patients were from febrile group, 20% of patients were from idiopathic group, 3.3% of patients were from progressive encephalopathy group and 16.7% patients were from symptomatic group. Out of the 10 non survivors, 80% of patients were from acute symptomatic group and 20% of patients were from idiopathic group, however these differences did not reach statistical significance. Table V below shows details of diagnoses under each etiologic sub-heading. Of acute symptomatic group, 6 patients had viral encephalitis, 3 patients had bacterial meningitis, and one each of homocystinuria with cerebral thrombosis, HIV with tuberculosis, acute disseminated encephalomyeitis, rickettsial encephalitis, congenital hydrocephalus with meningomyelocele, tubercular meningitis, nephrotic syndrome with acute renal failure with septic shock. One patient with progressive encephalopathy was of sturge weber syndrome. Out of the symptomatic group, 3 had severe mental retardation with cerebral palsy, one spastic CP and one diplegic CP.

Table 5: Diagnoses of patients under each classified category of SE and their mortality:

Aetiology	Total	Died	Survived
ACUTE SYMPTOMATIC	18	8	10
Viral encephalitis	6	3	3
Bacterial meningitis	3	1	2
Homocystinuria with cerebral thrombosis	1	0	1
HIV with tuberculosis	1	1	0
Acute disseminated encephalomyelitis	1	0	1
Rickettsial encephalitis	1	1	0
Congenital hydrocephalus	1	0	1
Tubercular meningitis	1	0	1
Nephrotic syndrome with septicaemia.	1	1	0
FEBRILE	8	0	8
IDIOPATHIC	8	2	6
SYMPTOMATIC	5	0	5
Mental retardation with cerebral palsy	3	0	3
Spastic cerebral palsy	1	0	1
Diplegic cerebral palsy	1	0	1
PROGRESSIVE ENCEPHALOPATHY i.e sturge weber syndrome	1	0	1
Total	**40**	**10**	**30**

Out of 10 children who died, 80 % were acute symptomatic and 20 % idiopathic. None amongst febrile, progressive encephalopathy or symptomatic group died. Of 30 survivors, 33.3% acute symptomatic, 26.7% febrile, 20% idiopathic and 16.7% symptomatic, 3.3% progressive encephalopathy.

Table 6: Showing comparison of blood pressure on admission and at 48 hours between survivors and non-survivors

Parameters	Outcome: Survivors N%	Outcome: Non-survivors N%	P-value
Abnormal Blood Pressure(hypotension)			
On admission	3 (10.0)	10 (100.0)	0.000
After 48 hours	0	7 (70.0)	0.000

Out of the 30 survivors, 10% of patients had hypotension on admission and none had at end of 48 hours. Out of the 10 non survivors, all 10 (i.e100%) patients had hypotension on admission and 7 (70%) of patients had at end of 48 hours. No child in our study had hypertension.

DISCUSSION

This study was a prospective study which was conducted in a tertiary level PICU in order to find the clinical profile and etiological factors for status epilepticus. Younger age group was the most commonly affected in our study (80%). Similar finding has been reported by Gulati *et al*[2] wherein 56% patients were below 5 years of age, Hussain *et al*[7]wherein 55% patients were less than 5 years of age and others[8,9,10] In this study, boys (62.5%) were more commonly affected as compared to girls (37.5%). Male predominance is also seen in studies by Gulati *et al*[2] and by Hussain *et al*[7] which could be perhaps be due to gender discrimination. Acute symptomatic was the commonest (n=18) of all the etiologies, followed by febrile (n=8) and idiopathic (n=8). In Murthy JM *et al* etiology included acute symptomatic (54%), remote symptomatic (7%), cryptogenic (19%), and established epilepsy (20%)[11]. Similar findings were observed in other studies[2,7].

CONCLUSION

In this study, children below 5 years formed the major group of patients with status epilepticus. Acute symptomatic was the commonest etiology perhaps associated with highest mortality as well.

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