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A OBSERVATIONAL STUDY CLINICAL, EPIDEMIOLOGICAL AND ETIOLOGICAL PROFILE IN PEDIATRIC STATUS EPILEPTICUS IN A TERTIARY CARE CENTER IN WEST BENGAL

Paediatrics

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ABSTRACT

INTRODUCTION: Status epilepticus (SE) is a medical and neurological emergency. The objectives of the study were to determine the clinical, etiological and epidemiological profile of SE in pediatric age group admitted to pediatric intensive care unit (PICU) in a tertiary care center at West Bengal.

MATERIALAND METHOD: An observational descriptive study, 108 children with age more than 28 days and upto 12 years presenting with SE were included in Department of Pediatric Medicine, R.G.Kar Medical College and Hospital, Kolkata from January 2016 to January 2017.

RESULTS AND DISCUSSION: Test of proportion showed that the proportion of the patients in the age group 5-10 years (54.6%) were significantly higher than other age group (Z= 2.75; p=0.006). 11(10.2%) patient was with age<1 year. Acute Symptomatic (38.9%) was the commonest among the etiologies followed by Idiopathic (31.5%) which were significantly higher than other etiologies (Z=4.36;p<0.001).

CONCLUSION: Patients with younger age are more vulnerable to develop SE. Most of the children belonged to lower class socio-economic status. Acute symptomatic is the most common etiology followed by idiopathic.Convulsive SE with generalized tonic clonic type of convulsion is the most common variety.

KEYWORDS

Clinical, Epidemiological , Etiological profile , pediatric Status Epilepticus, Etiology, Epidemiology, Clinical profile, West Bengal,

INTRODUCTION:

Status epilepticus (SE) is a medical and neurological emergency. Despite advances in treatment, it is still associated with significant morbidity and mortality. Conventional definition of status epilepticus is Continuous seizure activity lasting for 30 minutes or longer, [1] or intermittent seizure activity lasting for morethan 30 minutes from which patient does not regain consciousness. Lately it is becoming increasinglyrecognized that seizure duration of more than 10 minutes can lead to brain damage and duration of seizure activity in definition of status epilepticus is being decreased. The incidence of childhood convulsive SE (CSE) in developed countries is approximately 20/100,000/year but it varies according to socioeconomic and ethnic characteristics of the population [2]. The patient of status epilepticus are to be divided into 5 groups for analyzing the study according to the etiology:-

1) Idiopathic group: Seizures occurring in absence of acute central nervous system insult or systemic metabolic dysfunction or both
2)Remote symptomatic: Seizures occurring without acute provocation in a patient with prior history of CNS insult known to be associated with increased risk of convulsion example stroke, head trauma, meningitis , presence of static encephalopathy.
3) Febrile group: In this form of status epilepticus fever act as a sole provocative factor of status epilepticus.
4) Acute symptomatic group: Seizures during an acute illness in which there is a known neurological insult or metabolic dysfunction. The acute CNS insult can be produced by meningitis, encephalitis, head trauma, cerebral malaria, hypoxic encephalopathy or electrolyte imbalance.
5) Progressive encephalopathy: Seizures occurring at any time during progressive neurologic diseases. In this group neurodegenerative diseases, malignancies, neuro cutaneous syndromes are included. [3]

Thelonger the SE is present, more difficult is the control andmore is the risk of permanent neurological damage.Immediate intervention is important whenever the patienthas SE. It is important to consider SE whenever a seizureactivity or a series of seizure activity persist for more than10minutes or even for 5 minutes and to consider therapy [4-5]. Several studies have provided informationconcerning some of the important clinical features of thiscondition and developed insights in to the prediction of indicators of outcome [6]. However there is not much published data either population based or hospital-basedstudies from the Indian subcontinent.Age is a main factor of the epidemiology of SE and even within the pediatric population there are substantial differences between older and younger children in terms of incidence, etiology, and frequency of SE. SE can clinically manifest as convulsive (tonic clonic, clonic, tonic or myoclonic) or non-convulsive (absence, simple partial, complex partial) seizures. Duration of SE is a major confounding factor of response to antiepileptics and final neurological outcome. The reported mortality at hospital discharge in SE is 9–21%. The short-term mortality (all age groups) rates reported from India and other developing countries range between 10.5% and 28%. Convulsive SE results in severe neurological orcognitive sequelae in 11–16% of patients [7]. The objectives of the study were to determine the clinical, etiological and epidemiological profile of SE in pediatric age group admitted to pediatric intensive care unit (PICU) in a tertiary care center at West Bengal.

MATERIALAND METHOD:

Study Design

An observational descriptive study was conducted in Pediatric Intensive Care Unit (PICU), Department of Pediatric Medicine, R.G.Kar Medical College and Hospital, Kolkata from January 2016 to January 2017.We used the recent operational definition of SE that is defined as a continuous seizure activity or recurrent seizure activity without regaining of consciousness lasting for more than 5 minute as a part of operational definition. [7] In the past the cut off time was 30 minutes but this has been reduced to emphasize the risk involved in longer durations. Febrile status epilepticus is defined as febrile seizure lasting longer than 30 minutes [8]. 108 children with age more than 28 days and up to 12 years presenting with SE were included in our study. Patients more than 12 years and neonatal SE were excluded from our study.

Procedure Of Collection Of Data

After initial stabilization of the patient;consent being taken from parents/guardians in a predesigned form ,children having status epilepticus and fulfilling the inclusion criterion will be enrolled in the study .The duration of seizure activity should be confirmed from reliable patients relatives, attendant,medical records,referring physician note. The time taken to travel from the place the patient is residing to the hospital should also be considered. The duration of status epilepticus before starting the treatment was also noted.Etiology is determined by the history, investigation, neuroimaging findings.

Statistical Analysis

Statistical Analysis was performed with the help of Epi Info (TM) 3.5.3. EPI INFO is a trademark of the Centers for Disease Control and Prevention (CDC). Descriptive statistical analyses were performed to calculate the means with corresponding standard deviations (s.d.). Test of proportion was used to find the Standard Normal Deviate (Z) to compare the difference proportions and Chi-square (2c) test was performed to find the associations. In the cases where one of the cell frequencies were less than 5 corrected Chi-square () was used to find the association between variables. t-test was used to compare the means. $p \leq 0.05$ was taken to be statistically significant.

RESULTS AND ANALYSIS:

Test of proportion showed that the proportion of the patients in the age group 5-10 years (54.6%) were significantly higher than other age group (Z= 2.75; p=0.006). 11(10.2%) patient was with age<1 year.

The mean age (mean ± s.d.) of the patients was 62.87±23.42 months with range 7 – 110 months and the median age was 66 months.

Test of proportion showed that the proportion of the patients in the age group 61-80 months (36.1%) were significantly higher than other age group (Z= 0.82; p=0.41). 10.2% of the patients were in the age between 9 - 20 months.

Proportion of males (58.3%) was significantly higher than that of females (41.7%) (Z= 2.34; p=0.0193). Thus males were more prone to have status epilepticus than females.

t-test showed that there was no significant difference in mean age of males and females (t_{106}=0.15;p=0.87). So males and females were presented with status epilepticus at more or less same age.Percentage of children with lower class socio-economic status 57(52.8%) patients was significantly higher than other socio-economic class (Z= 4.03; p<0.001). Acute Symptomatic (38.9%) was the commonest among the etiologies followed by Idiopathic (31.5%) which were significantly higher than other etiologies (Z=4.36;p<0.001). Only 2(1.9%) was Progressive Encephalopathy. 37.0% of the patients were having prior history of convulsion/status epilepticus. Fever (52.8%) was the commonest among the predisposing-illness which was significantly higher (Z=3.89;p<0.0001).32.4% of the patients had meningeal-signs(Z=5.171;p<0.0001); [Table-1].

Table-1: Epidemiological And Clinical Profile Of Pediatric Status Epilepticus

		Number (n)	Percentage (%)	Z-value	p-value
Age Group (in years)	<1.0	11	10.2%	2.750	0.006
	1.0 – 5.0	38	35.2%		
	5.1 – 10.0	59	54.6%		
Gender	Male	63	58.3%	2.340	0.019
	Female	45	41.7%		
Socio-economic status (B. J. Prasad Scale)	Class-I (Upper)	2	1.9%	4.030	<0.001
	Class-II (Upper Middle)	6	5.6%		
	Class-III (Middle)	16	14.8%		
	Class-IV (Lower Middle)	27	25.0%		
	Class-V (Lower)	57	52.8%		
Etiology of SE	Acute Symptomatic	42	38.9%	4.360	<0.001
	Febrile Status	17	15.7%		
	Idiopathic	34	31.5%		
	Progressive Encephalopathy	2	1.9%		
	Remote Symptomatic	13	12.0%		
Type of convulsion	GTCS	89	82.4%	9.560	<0.001
	Myoclonic	3	2.8%		
	Partial	16	14.8%		
Type of Predisposing-illness	Drug withdrawal/Irregular Medication	28	25.9%	3.890	<0.001
	Fever	57	52.8%		
	Gastrointestinal	14	13.0%		
	Respiratory	9	8.3%		
Meningeal-signs	Present	35	32.4%	5.171	<0.001
	Absent	73	67.6%		
Prior-history of convulsion	Positive	40	37.0%	3.810	<0.001
	Negative	68	63.0%		

Abnormal Findings of Lumbar puncture was found for 27.8% of the patients.Abnormal Findings of Imaging was found for 44.4% of the patients.Cerebral Edema (31.3%) was the most common among the abnormal findings of imaging followed by Granuloma (25.0%) (Z=0.94;p=0.34).34.3% of the patients had abnormal EEG findings(Z=0.729;p=0.465); [Table-2].

Table-2: Salient Investigation In Pediatric Status Epilepticus

		Number (n)	Percentage (%)	Z-value	p-value
Lumbar puncture findings	Abnormal Findings	30	27.8%	2.951	0.003
	Normal Findings	27	25.0%		
	Not Done	51	47.2%		
Findings of Imaging (CT Scan or MRI brain)	Abnormal Findings	48	44.4%	1.532	0.126
	Normal Findings	37	34.3%		
	Not Done	23	21.3%		
Findings of Imaging	Cerebral Edema	15	31.3%	0.340	0.340
	Neurocysticercosis granuloma	7	14.6%		
	Tuberculous granuloma	5	10.4%		
	Sequlae of HIE	6	12.5%		
	Brain tumor	3	6.3%		
	Ventriculomegaly	8	16.7%		
	Stroke	4	8.3%		
Findings of EEG	Abnormal Findings	37	34.3%	0.729	0.465
	Normal Findings	32	29.6%		
	Not Done	39	36.1%		

DISCUSSION:

Hesdorffer DC et al and Hauser WA et al found that younger age group is most commonly affected. SheffaliGulati et al suggested that 56% of children were less than 5 years in their study. Predominant

involvement of younger age group as been reported previously [9,10, 11]. We found that the mean age (mean ± s.d.) of the patients was 5.23±1.95 years with range 0.58 – 9.16 years and the median age was 5.5 years. According to month, the mean age (mean ± s.d.) of the patients was 62.87±23.42 months with range 7 – 110 months and the median age was 66 months. The present study showed that 5-10 years (54.6%) of patients were significantly higher than other age group. The reason for this predominance of SE in younger children is not known. Probably, mechanisms for control of seizure activity are fragile in younger children and may get disrupted with minimal abnormalities in neurofunction.

Sixteen patients (53.3%) presented as SE without prior history of seizures [11]. Shinnar et a112% [12] and Herdorffer et al [9] reported when SE was associated with epilepsy it tended to be the first unprovoked seizure in 30% or it tended to be the seizure leading to diagnosis of epilepsy in 35%. They also reported 18% of unprovoked SE occurred in people with established epilepsy [9]. We found that 37.0% of the patients were having prior history of convulsion/status epilepticus and which was statistically significant ($Z=3.810$; $p<0.0001$).

Other risk factors that have been reported include drug overdose, decrease in antiepileptic drugs, hemorrhage in CNS, infections, cerebrovascular accidents tumors etc. [5]

Kumar et al found that forty two patients (60%) were males and 28 patients (40%) were females. Therefore male to female ratio were found to be 1.5:1 and it was found to be statistically significant [13]. Our study found that the ratio of male and female (Male :Female) was 1.4: 1.0. Corrected Chi-square () test showed that there was no significant association between age groups and gender of the patients ($p=0.59$). Thus status epilepticus was more or less equally distributed over age among males and females. The mean age (mean± s.d.) of males was 5.26±1.93 years with range 0.58 – 9.16 years and the median age was 5.66 years. The mean age (mean± s.d.) of females was 5.20±1.99 years with range 0.66 – 8.91 years and the median age was 5.00 years.

In this study, t-test showed that there was no significant difference in mean age of males and females ($t_{106}=0.15$;$p=0.87$). So males and females were presented with status epilepticus at more or less same age. Proportion of patients with lower class socio-economic status 57(52.8%) patients was significantly higher than other socio-economic class ($Z= 4.03$; $p<0.001$).

Kumar et al showed that acute symptomatic group was found to be the most common aetiology for SE and it comprised of 47.14% (33 cases) of total patients. Idiopathic group accounted for 27.14% (19 cases) while remote symptomatic accounted for 20% (14 cases); [13].

We found that acute symptomatic(n=42)(38.9%) was the commonest among the etiologies (viral meningitis was the commonest 54%)followed by idiopathic (31.5%) which were significantly higher than other etiologies (Febrile Status, Progressive Encephalopathy, Remote Symptomatic); ($Z=4.36$;$p<0.001$). This rising trend of Idiopathic SE is probably due to decreasing time cut-off as per recent operational guideline of SE [8].

We had found that proportion of patients with GTCS (82.4%) as convulsion was significantly higher than that of others ($Z=9.56$; $p<0.0001$). Only 3(2.8%) had Myoclonic.Gulati et al [11] found GTCS to be present in 63.3% of children.Fever (52.8%) was the commonest among the symptom in SE patients which was statistically significant($p<0.0001$) whereas Kumar et al showed the similar result [13].32.4% of the patients had meningeal-signs.It was found that abnormality oflumbar puncture was found in 27.8% children.Cerebral Edema (31.3%) was the most common among the abnormal findings of neuro-imaging which corroborates with Gulati et al [11].37 (34.3%) of the children with SE showed abnormality in EEG findings.

CONCLUSION:

SE is a severe life threatening emergency with substantial morbidity and mortality. Patients with younger age are more vulnerable to develop SE. Most of the children belonged to lower class socio-economic status. Acute symptomatic is the most common etiology followed by idiopathic. Convulsive SE with generalized tonic clonic type of convulsion is the most common variety.Cerebral oedema is the commonest neuroimaging finding.

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