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A STUDY ON ETIOLOGICAL EVALUATION OF CHILDREN AGED 2 MONTHS-12 YEARS WITH STATUS EPILEPSY IN A TERTIARY CARE CENTRE

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Abstract

Introduction: A seizure is transient occurrence of signs and/or symptoms resulting from abnormal excessive or synchronous neuronal activity in the brain. Seizures are the commonest pediatric neurological problem, by themselves or as manifestation of many underlying problems. Status epilepticus (SE) means that seizures continue for prolonged periods. Status epilepticus (SE) is a medical emergency that should be anticipated in any patient who presents with an acute seizure. The most common type of SE is convulsive status epilepticus (generalized tonic, clonic, or tonic-clonic), but other types do occur, including nonconvulsive status (focal with impaired awareness, absence), myoclonic status, epilepsia partialis continua, and neonatal status epilepticus.

Materials and Methods: The study started by proper selection of infants of 2 months to 12 years old children who fitted in the operational definition of status epilepticus. Consents from parents of the children enrolled were taken. After initial management investigations sent were blood glucose, blood gas analysis haematological, biochemical and microbiological study of blood (Urine and CSF where needed), brain imaging (MRI brain, CT scan) Electroencephalogram (EEG).

Results: 100 patients were studied. Mean age was 3.12 (Range 2 months-12 years). Male to female ratio is 1.3:1. 74% children had GTCS (generalized tonic clonic seizure), focal seizures were seen in 18% and non-convulsive status epilepticus was seen in 2%. The most common cause was found to be febrile seizure with status epilepticus which was 76%. 14% patients had structural lesions found in MRI. 4% cases were found to have ADEM (Acute Disseminated Encephalo-Myelitis). 6% cases were found to have diffuse slowing on EEG and 8 % showed bilateral epileptiform discharges on EEG.

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Conclusion: Status epilepticus is a common neurological emergency in children. The mortality and morbidity associated with SE has decreased over the years due to a systematic approach and prompt management. Earlier, duration of status epilepticus was 30 minutes as per definition. Pathologically, however, hippocampal neurons begin to die after 30 minutes of sustained seizure activity. So, using operational definition of 5 mins, is helpful as it prevents brain damage. This was the reason for using the operational definition of 5 mins, in our study.

Key Words: seizure, Status epilepticus, EEG, Acute Disseminated Encephalo-Myelitis, mortality and morbidity.

INTRODUCTION

A seizure is transient occurrence of signs and/or symptoms resulting from abnormal excessive or synchronous neuronal activity in the brain. Seizures are the commonest pediatric neurological problem, by themselves or as manifestation of many underlying problems. Status epilepticus (SE) means that seizures continue for prolonged periods.

Status epilepticus (SE) is a medical emergency that should be anticipated in any patient who presents with an acute seizure.

The most common type of SE is convulsive status epilepticus (generalized tonic, clonic, or tonic-clonic), but other types do occur, including nonconvulsive status (focal with impaired awareness, absence), myoclonic status, epilepsia partialis continua, and neonatal status epilepticus.

The incidence of SE ranges between 10 and 60 per 100,000 population in various studies. SE is most common in children younger than 5 yr of age, with an incidence in this age-group of > 100 per 100,000 children. Approximately 30% of patients presenting with SE are having their first seizure, and approximately 40% of these later develop epilepsy.

Generalized, convulsive status epilepticus refers to more than 5 min of (i) continuous seizures or (ii) two or more discrete seizures between which there is incomplete recovery of consciousness. Pathologically, however, hippocampal neurons begin to die after 30 minutes of sustained seizure activity. the limitation of this definition thus suggests that treatment should not be initiated until pathological damage has already been demonstrated. Newer operational definitions have suggested that seizures lasting longer than 5 minutes are unlikely to discontinue spontaneously and should be treated. This is a more useful definition since treatment for SE is not delayed. In addition, individual unprovoked seizures can on occasion be observed and may not warrant aggressive treatment. In our study duration of SE has been taken as 5 minutes. We wanted to determine the aetiology and epidemiology of status epilepticus in 2-months-old infants to 12-years-old children and assess the neuroimaging.

MATERIALS AND METHODS

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Place of Study: Department of Paediatrics, Department of Paediatrics, Maharajah Institute of Medical Sciences, Vizianagaram, AP.

Duration of Study: January 2022 to December 2022 **(**1 year).

Study Design: Descriptive study.

Study Population: 2 months old infants-12 year's old children admitted with status epilepticus in our institution.

Sample Size: 100

Inclusion Criteria

1. Age more than 2 months up to 12 years old children.

2. More than 5 minutes of continuous seizure or two discrete seizure with incomplete recovery of consciousness.

Exclusion Criteria

1. Pseudoseizure or seizure mimickers.

2. Children with head trauma.

3. Poisoning.

The study started by proper selection of infants of 2 months to 12 years old children who fitted in the operational definition of status epilepticus. Consents from parents of the children enrolled were taken. After initial management investigations sent were blood glucose, blood gas analysis haematological, biochemical and microbiological study of blood (Urine and CSF where needed), brain imaging (MRI brain, CT scan) Electroencephalogram (EEG).

RESULTS

100 patients were studied. Mean age was 3.12 (Range 2 months-12 years). Male to female ratio is 1.3:1. 74% children had GTCS (generalized tonic clonic seizure), focal seizures were seen in 18% and non-convulsive status epilepticus was seen in 2%. The most common cause was found to be febrile seizure with status epilepticus which was 76%. 14% patients had structural lesions found in MRI. 4% cases were found to have ADEM (Acute Disseminated Encephalo-Myelitis). 6% cases were found to have diffuse slowing on EEG and 8 % showed bilateral epileptiform discharges on EEG.

Age group (in years)	Number	Percentage
<1	8	8%

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1-5	70	70%
6-10	22	22%
Total	100	100%

Table 1: Age distribution.

Gender	Number	Percentage
Male	56	56%
Female	44	44%
Total	100	100%

Table 2: Gender distribution of patients

Chief complaints	Number	Percentage
Fever with convulsion	76	76%
Unprovoked convulsion	14	14%
Fever with convulsion with altered consciousness	4	4%
Repeated fall with loss of consciousness	2	2%
Twitching of eyes with focal seizure with altered sensorium	2	2%
Unprovoked seizures with unable to move right hand and leg	2	2%
Total	100	100%

Table 3: Distribution According to Chief Complaints of the Patients

Type of Seizure	Number	Percentage
GTCS	74	74%
Focal	18	18%
Focal with secondary generalization	6	6%
NCSE	2	2%
Total	100	100%

Table 4: Distribution According to Type of Seizure of the Patients

Duration of Seizure (in Minute)	Number	Percentage
<10	36	36%
10-19	40	80%
20-29	16	32%
30-35	8	16%
Total	100	100%

Table 5: Distribution According to Duration of Seizure

Family history of seizure	Number	Percentage

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Present	14	14%
Absent	86	86%
Total	100	100%

Table 6: Distribution According to Family History of Seizure of the Patients

MRI Brain	Number	Percentage
Encephalitis	12	12%
Periventricular leucomalacia	10	10%
Neurocysticercosis	6	6%
Acute disseminated encephalomyelitis	4	4%
Dysembryoplastic neuroepithelial tumour	2	2%
Lissencephaly with DWM	2	2%
Porencephaly	2	2%
Tuberculoma	2	2%
Tuberous sclerosis	2	2%
Normal	58	58%
Total	100	100%

Table 7: Distribution Findings of MRI Brain of the Patients

EEG	Number	Percentage
Bitemporal epileptiform discharges	4	4%
Diffuse slowing	6	6%
Diffuse slowing with seizure activity	4	4%
Epileptiform discharges	8	8%
Focal discharge	2	2%
Generalized seizure disorder	2	2%
Generalized slowing	2	2%
Paroxysmal dysrhythmia	2	2%
Seizure disorder	2	2%
Normal	68	68%
Total	100	100%

Table 8: Distribution Findings of EEG of the Patients

CSF Abnormality (Cytological, Biochemical)	Number	Percentage
Abnormal	10	10%
Normal	10	10%
Not done	80	80%
Total	100	100%

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Table 9: Distribution of Findings of CSF Abnormality (Cytological, Biochemical) of the Patients

DISCUSSION

In the study conducted by Kumar M, Kumari R, Narain N, it was found that fever was the most common symptom associated with patients of SE and it was seen in 57 patients (67.14%). In our study 16% cases had a previous history of convulsion while 84% presented with SE as first episode of convulsion. In the study by Kumar M, Kumari R, Narain N, 25.7% had prior history of convulsion whereas 74.3% presented with SE as first episode of convulsion.

Our study showed that only 14% had a family history of seizure. In a study conducted by M Wipopo EE, Akhatar S, Fan P in Zhongnan hospital, China it was seen that family history of seizure was noted in only 9.5% patients. In a study conducted by Singh RK, Stephens S, Berl MM, Chang T it was found 25% had a family history of seizure. Shinnar S, Pellock JM, Berg AT, O'Dell C found in their study 11% had a family history of epilepsy while 15% had a family history of febrile seizures.

In our study 28% of patients with status epilepticus were admitted in PICU. No mortality was seen in our study. Lacroix J, Deal C, Gauthier M studied admission of children with status epilepticus in paediatric intensive care unit (PICU) over 10 yrs and showed that 147 children 0 to 16 yrs., of age (median 1; mean 3.4 +/- 3.9 [SD])with status epilepticus were admitted to a PICU.

A meta-analysis reported structural lesions in 7.8% of childhood SE, commonly CNS malformations, trauma, and stroke/haemorrhage. In a more recent study, the yield of MRI to detect structural lesions in convulsive SE was 31%. In the Indian setting, where inflammatory granulomas are a common cause of seizures13, neuroimaging is likely to provide a higher yield.

In our study cerebrospinal fluid examination was done in 20% children. Among them 10% children showed meningitis of which 5% are of bacterial meningitis. Remaining 5 % showed viral meningitis. CSF for Japanese encephalitis (JE) antibody was found in 4% patients. CSF for herpes simplex virus (HSV) antibodies was found in 6% cases. Our study was comparable to that found by Sadarangani M, Seaton C, Scott JA in Kenya which showed that 9% had acute bacterial meningitis. Similarly, in another study conducted by Bleck TP it was seen central nervous system (CNS) infection was seen in 11% cases. Bucchalter J in his study showed that the most common acute symptomatic cause was CNS infection (9%). Smith DM, McGinnis EL, Walleigh DJ, Abend NS in their study ‘Management of status epilepticus in children’ showed that CNS infections was found in 3% cases.

CONCLUSION

Status epilepticus is a common neurological emergency in children. The mortality and morbidity associated with SE has decreased over the years due to a systematic approach and prompt

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management. Earlier, duration of status epilepticus was 30 minutes as per definition. Pathologically, however, hippocampal neurons begin to die after 30 minutes of sustained seizure activity. So, using operational definition of 5 mins., is helpful as it prevents brain damage. This was the reason for using the operational definition of 5 mins., in our study.

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