Status Epilepticus in Children: a five-year Experience at Aga Khan University-Hospital

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Abstract

Objective: Status epilepticus is an under diagnosed entity in Pakistan. It is a potentially reversible condition but has a high mortality, if it is not recognized and managed on time. The purpose of this study was to determine the clinical profile and the relationship of mortality of status epilepticus with its known risk factors.

Methods: This was a retrospective study. Medical records of all the patients admitted in the last five years (1998-2002) with a diagnosis of status epilepticus (ICDcode 345.30, 345.31) were reviewed. Data was recorded on a Performa and analyzed by using the statistical programme SPSS, chi square and Fischer exact test.

Results: The total number of patients were twenty-four. Sixteen patients were males (66.7%). Mean age was fifty-eight months and mean duration of hospital stay 5.5 days (range 2 to 22days). Eight patients were diagnosed to have epilepsy. Four (16.7°/x) had a previous history of status epilepticus. Three patients presented with status epilepticus for the first time without any previous history of seizures. Ten patients required midazoiam infusion (41.7%) and out of these 3 (12.5%) were also givers thiopentone infusion to control the seizures. Nine patients were shifted to the ICU for ventilation and control of seizures. Mortality in our study was 25%. Risk factors for mortality included age less than or equal to one year, abnormal MR , type of the status epilepticus and the total duration of status epilepticus. No significant relationship was found with any of the known risk factors

Conclusion: Status epilepticus is a neurological emergency. A very high mortality was seen in our study. No risk factors were identified for this high mortality (JPMA 53:597:2003).

Introduction

Status epilepticus (SE) is a potentially threatening medical emergency. It is a teen applied to situations in which seizures occur so frequently that complete recovery between fits do not take place.) A more substantive definition is „continuous seizures lasting for 30 minutes or longer or recurring seizures occurring with impairment of consciousness between seizure activity.-[11]

Status epilepticus remains the most serious neurological emergency. The greatest number of cases occur in children[3], with the average age being 3 years. In 50-86%of children with status it may be the initial or only presentation of seizure disorder.

Mortality rates have decreased (3-6%) world wide and this is due to more effective management of status epilepticus.[4] Mortality and morbidity is related to the underlying cause and the duration of status epilepticus additionally. If under treated or inappropriately treated it may result in significant brain injury and even death.' Neurological sequelae of status epilepticus whether be it motor delay or cognitive impairment range from 9-29o,e. Subsequent epilepsy is seer) in 30% of individuals.+

In our country some work has been done on epilepsy and febrile convulsions in ehildren.[5,6] Although status epilepticus is frequently seen in the pediatric age group, no data exists on it's etiology and risk factors in our population.

In this study we have reviewed our pediatric cases of status epilepticus (including non-convulsive status epilepticus) for the last five years (1998-2002) in order to determine the distribution of age, sex, etiology and to assess the risk factors for mortality.

Methods

This was a retrospective study and included all children admitted to the Aga Khan University Hospital with a diagnosis of status epilepticus. Charts were reviewed from 1998-2002. Infants under the age of one month were not included because neonatal seizure is a separate entity, with different presentation, etiology and prognosis. 4

Status epilepticus was defined as "a single seizure lasting for thirty minutes or repeated seizures without a return of consciousness in between the seizure".7 The diagnosis of status epilepticus in our study was based on both the clinical and EEG findings. The duration of seizures was assessed by questioning the time the seizure started before coming to the hospital and the time taken for control of seizures in hospital. Types of SE were categorized into generalized tonic clonic, focal, and focal to secondary generalization and non convulsive status epilepticus. Ali children included in the study were admitted frorn the emergency department.

Information was collected on standard data collection forms. Relevant information regarding age, sex, type of SE, previous history of seizures or status epilepticus, duration of seizures before coming to the ER, time required to control the seizures in the hospital, antiepileptic medications, discontinuation of the medicines, drug levels, lumbar puncture, EEG and MRi and the treatment given were recorded on standard forms . The etiology of SE was grouped into Idiopathic (where no acute CNS or metabolic dysfunction was seen), Acute symptomatic (status epilepticus occurring during an acute illness with known CNS or systemic metabolic dysfunction, including febrile seizures) and remote symptomatic (underlying acquired, developmental or congenital CNS disorder).°

Risk factors for mortality were assessed with the total duration of SE, age less than or equal to two years, sex, SE associated with abnormal MRI and the type of SE. Data was entered ore Statistical Package for Social Sciences (SPSS). Chi square test and Fischer exact test were used for risk factor analysis.

Results

A total of 24 children were admitted with a diagnosis of status epilepticus. Sixteen (66.7%) were females and eight (33.3°,%) males. The mean age of the patients was fifty-eight months (range 3-158 months). The mean duration of hospital stay was 5.5 days (range 2-22days).

Etiology of status epilepticus varied. Eight patients had a diagnosis of idiopathic epilepsy. Three of these presented for the first time with SE and did not have any prior history of seizures. Eleven patients were on regular antiepileptic drugs. One patient had discontinued the medications one month prior to the presentation. Five patients (41 %) had low AED levels, 4 (16.7%) had a previous history of SE and were on regular anti epileptic drugs (AED).

Four patients (16.7%) were diagnosed as having encephalitis as the cause of SE. One patient each had hypertensive encephalopathy, urernic encephalopathy, congenital rubella infection, CNS malformation, and febrile seizure. Two patients had hypoxic ischemic encephalopathy and 2 neurodegenerative disease. Three patients had post meningitic and post encephalitic sequelae leading to SE. Etiology in relation to age is given in Figure.

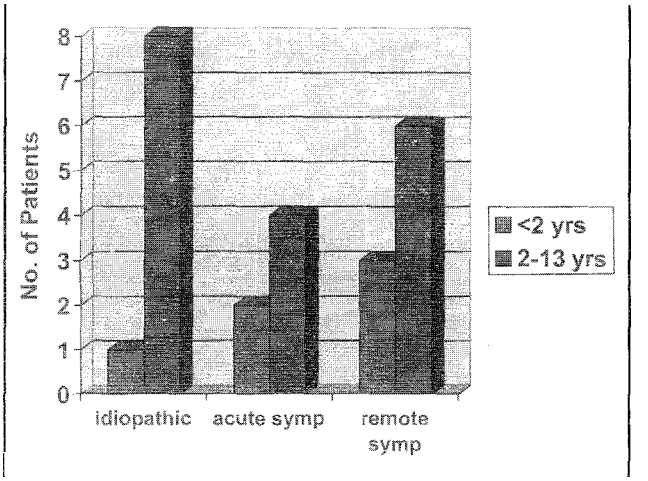

Figure. Causes leading to Status epilepticus in different a_•e groups.

Seventeen (70°ro) children had generalized status epilepticus. One (4.2°%) each had a non-convulsive and focal SE. In five patients (20.8%) seizures started as focal and then became generalized.

Ten patients (41.7%) did not respond to the first line management (diazepam, phenytoin and phenobarb) and were given midazolam infusion-Three of these did not respond to midazolam and required Thiopentone infusion. MRI was done in nine patients (37.5%).Two had hydrocephalus and two evidence of cerebritis and grey matter degeneration. Cerebral atrophy Encephaiornalacia and Cerebral infarction was seen in 3 and Lumbar puncture was abnormal in two patients. Odds ratio was applied to the duration of control of seizures in the emergency room (>or<30 minutes) to the duration of seizures before coming to the hospital.

In fourteen patients (58.3%) it took greater than thirty minutes to control the seizures in the hospital. Eight (57.1%) of these were having seizures for more than half hour before coming to the emergency roon.. Ten patients (41.7"•®) required less than half hour to control the seizures in the hospital and out of them four (40.0%) had seizures for More than half hour before coming to the emergency. No statistically significant relationship was found between the two groups (p<0.68).

We also looked for any relationship between the duration of seizure control in the hospital and previous

history of status epilepticus. No significant relationship was found between the two (p<0.98).

In our study the mortality was 25% of which 5 were males. Four of them (66.7%) expired in the ICU. Two patients (33.3%) were under two years and 66.7% patients belonged to the older group (3-13 years). The cause of death is presented in Table 1. Risk factors for mortality were assessed with age less than or equal to two years, sex of the child, abnormal MRI, type of status epilepticus and the total duration of SE. No significant relationship was found with any of the known risk factors (Table 2).

Table 1. Diagnosis in expired patients.

Diagnosis	No. of **deaths**
Congenital Rubella infection	I
Uremic encephalopathy	I
Acute encephalitis	2
Post encephalitic	i
Idiopathic	1

Table 2. Risk factors for mortality.

Risk Factor	No of deaths	P Value
Age < 2 years	2	1.00
Sex(male)	5	0.62
Abnormal MRl	2	0.46
Seizure Control >30min	5	0.16
Focal Seizures	.,	0.68

Discussion

SE has been reported to be more common in boy. [4,5] In our study majority of children were females (66.6%). Mean age of our patients (4.10 years) was slightly higher than what is reported in the literature. [3] Wu reports generalized convulsive status to be more common in children <5 years and in the elderly.

A prior history of epilepsy is a risk factor for generalized convulsive status epilepticus. [9] Low antiepileptic drug levels are modifiable risk factors [7] In our study almost 32% *of* children had underlying epilepsy and 37% had low drug levels. The most common etiology in young children is infection with fever which carries a low mortality rate. In young children up to 3 years age presenting with SE, acute symptomatic etiologies and progressive neurological disorders are more prevalent whereas in older children idiopathic etiologies are reportedly higher. [4,9] In our study we found that acute symptomatic and remote symptomatic causes were factors leading to SE in younger children. In the older age group 41.2% were due to idiopathic causes. Recurrences of SE have frequently been reported. Gerald reported that 33.3% of his patients with SE had a previous episode of SE.W In our patients with SE 16.7% gave a history of a previous SE. Generalized tonic clonic type of SE has been reported in 83 ¢0 *of* the cases. [3] Lal Koul and Raj in 1997 [11] reported 65% patients having generalized tonic clonic type of Status Epilepticus. Our study also showed that 70% of the patients had generalized tonic clonic type of status epilepticus.

In the absence of coexisting acute brain insult, prompt and appropriate treatment of SE is usually associated with a good outcome.") Mortality is related to the etiology, associated abnormalities on the EEG and the MR!, age of the patients [4,12] duration of the seizures and type of SE. In our study no statistically significant relationship was found between the above-mentioned variables and death (Table -').

Long term neurological sequelae have been reported in children after status epilepticus. Chronic encephalopathi and brain atrophy following SE develops in 6-15% cases.=),;? As we had very lirnited follow up of patients after discharge, no long term sequelae could be assessed.

In conclusion, males were more affected by S.E. The mortality rate was high and no correlation was found with the risk factors. Long term studies are needed to determine the cause of the high mortality and its associated risk factors.

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