International Journal of Contemporary Pediatrics
Selvan T et al. Int J Contemp Pediatr. 2017 May;4(3):878-881
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20171690

Original Research Article

A study of the etiology and short term outcome of status epilepticus in children

Tamil Selvan*, Nagaraj M. V., Saravanan P., Mrigender Nath Tudu

Department of Paediatrics, Sapthagiri Institute of Medical Sciences and Research Centre, Bangalore, Karnataka, India

Received: 12 March 2017
Accepted: 03 April 2017

***Correspondence:**
Dr. Tamil Selvan,
E-mail: drselvantg@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Convulsive status epilepticus is the most common childhood medical neurological emergency, and is associated with significant morbidity and mortality. Most data for this disorder are from mainly adult populations and might not be relevant to childhood. This study was done to obtain a uniquely paediatric perspective. The objective of the study was to the etiology and short term outcome of patients admitted with status epilepticus between the age group 1 month to 12 years at a medical college hospital.
Methods: Study design: Prospective descriptive study. Study Place: Department of Paediatrics, SIMS and RC, Bangalore, India. Study population: All children in the age group of 1 month to 12 years admitted with status epilepticus. Sample size:66. Study period: From January 2016 to December 2016.
Results: Prevalence of status epilepticus among children admitted in this study was 8.7%. Most common age was found to be 1-3 years (54.5%). Preponderance of male (51.5%) over female (48.5%) was observed. The two most common etiology observed was Atypical febrile seizures (33.3%) and meningitis (22.7%). 57.5% children presented as first episode of seizure and duration of seizure was less than 2 hours in 65.1%.
In our study, short term mortality rate was found to be 3% and morbidity was found to be 9% and meningitis was responsible for all the deaths. The mortality and morbidity in the form of neurodeficits were observed between the age group of 1 month to 3 years. Based on the duration of seizure lasting more than 8 hours, two third had mortality and one third had morbidity.
Conclusions: Status epilepticus is a severe life threatening emergency with substantial morbidity and mortality. Major causes were due to atypical febrile seizure and meningitis. Patients with younger age, male sex and seizures lasting longer duration had higher mortality and morbidity, predicting the poor outcome.

Keywords: Atypical febrile seizures, Meningitis, Status epilepticus

INTRODUCTION

Status epilepticus (SE) is a major medical and neurological emergency. Despite advances in treatment, it is still associated with significant morbidity and mortality. SE affects people of all ages, though it is more common and causes greater morbidity and mortality in infants.[1-5] Status epilepticus (SE) is an epileptic seizure of greater than five minutes or more than one seizure within a five-minute period without the regaining the conciousness in between the episodes.[6] 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.[7]

Age is a main determinant of the epidemiology of SE and even within the paediatric 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 determinant of response to antiepileptics and final neurological outcome. It has been reported that the mortality is nearly 10-fold higher for seizure lasting 30 min or longer than for those lasting 10–29 min.[8] The recognition and rapid treatment of seizures is important during acute illness.[9-11] The failure to diagnose status epilepticus leads to high mortality. Lately it is becoming increasingly recognized 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.[12,13] The longer the SE is present, more difficult is the control and more is the risk of permanent neurological damage. Immediate intervention is important whenever the patient has SE.[13] It is important to consider SE whenever a seizure activity or a series of seizure activity persist for more than 10 minutes or and to consider therapy.[14]

The objective was to study the etiology and short term outcome of patients admitted with status epilepticus between the age group 1 month to 12 years at a medical college hospital.

METHODS

A total of 763 children in the age group of 1 month to 12 year were admitted to PICU, General hospital, SIMS and RC, Bangalore during 1-year study period. Among them 66 had status epilepticus.

Study design: Prospective descriptive study. Study Place: Department of Paediatrics, SIMS and RC, Bangalore, India. Study population: All children in the age group of 1 month to 12 years admitted with status epilepticus. Sample size: 66. Study period: From January 2016 to December 2016

Inclusion criteria

- All children admitted in the PICU with status epilepticus in the age group of 1 month to 12 years.
- Children admitted for other complaints and developing status epilepticus during the course of their illness.

Exclusion criteria

- Neonatal seizures.
- Age group more than 12 yrs.
- Seizures in developmentally abnormal children.

On admission, a detailed history was taken, detailed clinical examination was done and were subjected to relevant investigations. The data regarding their name, age, sex, type of seizures according to international classification of epileptic seizures, past history of seizures, birth history, developmental history, family history, drug history and immunization status were collected in a preformed proforma. A detailed examination including a complete neurological examination was done. Investigations including complete haemogram, blood sugar, Serum sodium, Serum calcium were done for all patients. Liver function test, chest X-ray and mantaux test were done only when indicated. CSF analysis was not done routinely. EEG and imaging studies were done wherever indicated and results recorded. Children were assessed for the etiology and short term outcome during their stay at hospital under the criteria for complete recovery, recovered with neurological deficits, discharged against medical advice or absconded and mortality.

RESULTS

Table 1: Prevalence.

Status epilepticus	Frequency	Percentage
Present	66	8.7%
Absent	697	91.3%
Total	**763**	**100**

Among 763 children admitted to PICU, status epilepticus was observed in 8.7%.

Table 2: Age.

Age group	Frequency	Percentage
1 month to 12 months	15	22.72
1-3 years	36	54.54
4-6 years	6	9.09
7-12 years	9	13.63
Total	**66**	**100**

Out of 66 children, most affected were 1-3 years (54.5%) followed by 1 month to 12 months (22.72%).

Table 3: Gender.

Sex	Frequency	Percentage
Male	34	51.51
Female	32	48.48
Total	**66**	**100**

Out of 66 children, males (51.51%) were affected more than the females (48.48%).

Table 4: Duration of seizures.

Duration of seizures	Known seizure disorder	First episode
< 2 hours	18 (27.2%)	25 (37.8%)
2-8 hours	9 (13.6%)	11 (16.6%)
> 8 hours	1 (1.5%)	2 (3%)

Out of 66 cases of status epilepticus, 57.5% children presented as first episode of seizure and duration of seizure was less than 2 hours in 65.1%.

Out of 66 cases, commonest cause was due to atypical febrile seizures (33.3%) followed by meningitis (22.7%). Death was seen in 3% of the cases and was due to meningitis. Neurodeficits was observed in 9%.

Table 5: Etiology and short term outcome.

Etiology	Total	Mortality	Neurodeficits
Atypical febrile seizures	22 (33.3%)	0	1 (1.5%)
Meningitis	15 (22.7%)	2 (3%)	3 (4.5%)
Encephalitis	5 (7.5%)	0	0
Hypoglycemia	4 (6%)	0	0
Hypocalcemia	1 (1.5%)	0	0
Hyponatraemia	1 (1.5%)	0	0
Hypernatraemia	4 (6%)	0	0
Cns tuberculosis	2 (3%)	0	1 (1.5%)
Neurocysticercosis	1 (1.5%)	0	0
Head trauma	6 (9%)	0	1 (1.5%)
Epilepsy	5 (7.5%)	0	0
Total	**66 (100%)**	**2 (3%)**	**6 (9%)**

Table 6: Age specific short term outcome.

Age group	Mortality	Neurodeficits
1 month to 12 months	1 (1.5%)	2 (3%)
1-3 years	1 (1.5%)	4 (6%)
4-6 years	0	0
7-12 years	0	0
Total	**2 (3%)**	**6 (9%)**

Out of 66 cases, death was observed in 3% of the cases and neurodeficits was observed in 9% of the cases and all of them between 1 month to 3 years of age.

Table 7: Short term outcome based on duration.

Duration	Mortality	Neurodeficits
< 2 hours	0	1
2-8 hours	0	4
> 8 hours	2	1

Out of 66 cases of status epilepticus, 3 children had seizures lasting more than 8 hours, out of which 2 died and one had neurodeficit.

DISCUSSION

Status epilepticus is a major medical and neurological emergency. Despite advances in treatment, it is still associated with significant morbidity and mortality. A total of 763 children in the age group of 1 month to 12 year were admitted to PICU, General hospital, SIMS and RC, Bangalore during 1-year study period.

Among them 66 (8.6%) had status epilepticus. The prevalence of status epilepticus varies from 2.3%-9.1% as per western literature and our results are corroborative to the reports.[15]

The prevalence rate is age dependent and is highest in the age group less than 3 years of age. 77.2% (51/66) of patients were less than 3 years of age in our study. Predominant involvement of younger age group has been reported by different authors.[14,16] Among gender there were more males in 51.5% (34/66) and are corroborative with other works.[17,18] The two most common causes of status epilepticus in our study were an atypical febrile seizure in 33.3% (22/66) and meningitis in 22.7% (15/66) and are in concordance with Nahin Hussain.[19]

In our study 57.5% (38/66) had presented for the first time without any past history of seizures and are in concordance with other work and the first-time presenters 19.6% (13/66) had a longer duration of seizures in comparison to cases with prior history of seizures.[20-24]

Mortality was associated with bacterial meningitis, which has a worse outcome in this area than in developed countries [25] and has also been associated with a poor outcome in children with CSE.[26]

In our study 3% (2/66) children less than 3 years had mortality and are in concordance with other studies which ranges from 3-9%.[26,27] While 9% (6/66) of the surviving children developed neurodefecits with most of them less than 3 years (6%) and are in concordance with other studies [26,27] indicating younger age greater the risk.

With regard to duration, out of 3 children who had seizures lasting more than 8 hours, 2 children were died and one child had neurodeficits indicating longer the duration poorer the outcome and are in concordance with study by Sheffali Gulati.[28]

CONCLUSION

Status epilepticus is a severe life threatening emergency with substantial morbidity and mortality. Major causes

were due to atypical febrile seizure and meningitis Patients with younger age, males and seizures lasting longer duration had higher mortality and morbidity, predicting the poor outcome. It requires the imediate detection of etiology and aggresive treatment for reducing the mortality and morbidity.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Shinar S, Berg AT, Moshe SL, O'Dell C, Alemany M, Newstein D. et al. The risk of seizure recurrence after a first unprovoked afebrile seizure in childhood: an extended follow-up. Pediatr. 1996;98:216-25.
2. Hauser AW. Status epilepticus. Frequency, etiology, and neurological sequelae. Adv Neurol. 1983;34:3-14.
3. Maytal J, Shinnar S, Moshe SL, and Alvarez LA. Low morbidity and mortality of status epilepticus in children. Pediatr. 1989;83:323-33.
4. Chin RF, Neville BG, Peckham, Bedford H, Wade, A, Scoot RC et al. Incidence, cause, and short-term outcome of convulsive status epilepticus in childhood: prospective population-based study. Lancet. 2006;368:222-9.
5. Raspall-Chaure M, Chin RF, Neville BG, and Scott RC. Outcome of paediatric convulsive status epilepticus: a systematic review. Neurol. 2006;5:769-79.
6. Trinka E, Höfler J, Zerbs A. Causes of status epilepticus. Epilepsia. 2012;53(4):127-38.
7. Shorvon S, Ferlisi M. The treatment of super-refractory status epilepticus: a critical review of available therapies and a clinical treatment protocol. Brain. 2011;134:28021.
8. De Lorenzo RJ, Garnet L, Towne AR, Waterhouse, EJ, Boggs JG, Morton L et al. Comparison of status epilepticus with prolonged seizure episodes lasting from 10 to 29 minutes. Epilepsia. 1999;40:164-9.
9. Cherian A, Thomas SV. Status epilepticus. Ann Indian Acad Neurol. 2009;12:140-53.
10. Kalita J, Nair PP, Misra UK. A clinical, radiological and outcome study of status epilepticus from India. J Neurol. 2010;257:224-9.
11. Lowenstein DH, Bleck T, Macdonald RL. It's time to revise the definition of status epilepticus. Epilepsia. 1999;40:120.
12. Walker MC. The epidemiology and management of status epilepticus. Curr Opin Neuro.11998;11:149-54.
13. Khurana DS. Treatment of status epilepticus, Ind J Pediatr. 2000;67;1:80-7.
14. Phillips SA, Shanahan RJ. Etiology and mortality of status epilepticus in children a recent update. Arch Neuro. 1989;46(1):74-6.
15. Kariuki SM, Mwesige AK. Prevalence and factors associated with convulsive status epilepticus in Africans with epilepsy. Neurol. 2015;84(18):1838-45.
16. Hesdorffer DC, Logroscino G, Cascino G, Annegers JF, Hauser WA. Incidence of status epilepticus in Rochester, Minnesota.1965-1984. Neurol. 1998;50:735-41.
17. Wilmshurst JM, Badoe E, Wammanda RD, Mallewa M, Kakooza-Mwesige A. Child neurology services in Africa. J Child Neurol. 2011;26:1555-63.
18. Akpan MU, Nyong EE, Abasiubong. Pre-hospital treatment and outcome of status epilepticus in children in Nigeria. Case Study Case Rep. 2011;1:82-91.
19. Hussain N, Appleton R, Thorburn K. Aetiology, course and outcome of children admitted to paediatric intensive care with convulsive status epilepticus: A retrospective 5-year review. European journal of epilepsy. 2007;16(4):305-12.
20. DeLorenzo R, Towne A, Pellock J and Ko D. Status epilepticus in children, adults and the elderly. Epilepsiu. 1992;33(4):15-25.
21. Aicardia J and Chevrie J. Convulsive status epilepticus in infants and children. A study of 239 cases. Epilepsia. 1970;11:187-97.
22. Maytal J, Shinnar S, Moshb S. and Alvarez L. Low morbidity and mortality of status epilepticus in children. Pediatrics. 1989;83:323-31.
23. Hauser WA, Anderson VE, Loewenson RB, McRoberts SM. Seizure recurrence after a first unprovoked seizure. N Engl J Med. 1982;307(9):522-8.
24. Kang DC, Lee YM, Lee JS, Kim HD, and Coe ed CJ. Prognostic Factors of Status Epilepticus in Children. 1982;307:522-8.
25. Mwangi I, baerkley J, Lowe B, Peshu N, Marsh K , Newton CR .Acute bacterial meningitis in children admitted to rural kenyan hospital: increasing antibitic resistance and outcome. Pediatr Infect Dis J. 2002;21(11):1042-8.
26. Chin RF, Neville BG, Scott RC. A systematic review of the epidemiology of status epilepticus. Eur J Neurol. 2004;11:800-10.
27. Kwong KL, Lee SL, Yung A, Wong VC. Status epilepticus in 37 Chinese children: aetiology and outcome. J Paediatr Child Health 1995;31:395-8.
28. Gulati S, Kalra V, and Sridhar MR .Status Epilepticus in Indian Children in a Tertiary Care Center. Indian J Pediatr. 2005;72(2):105-8.

Cite this article as: Selvan T, Nagaraj MV, Saravanan P, Tudu MN. A study of the etiology and short term outcome of status epilepticus in children. Int J Contemp Pediatr 2017;4:878-81.