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Clinico-etiological profile of childhood seizures at a tertiary care hospital in southern India – An observational study

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ABSTRACT



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Pediatric seizures are a common neurological problem and occur in children of all ages. Most of the prior studies reported in the literature had paid attention to epilepsy and clinical seizure types. There is limited data on the causes of an episode of childhood seizure in developing countries like India especially Tamil Nadu. Hence, this study was aimed to find the common aetiology of seizure and clinical characteristics of seizure types in different age groups presenting to tertiary centre in Southern India. A retrospective hospital-based observational study was conducted in a teaching hospital, Southern India. All children who presented with seizures to the pediatric emergency department in the period between January-June 2017 were included in the study. Clinical presentations, laboratory investigations, brain imaging studies, and follow up EEG screening were analyzed. Seizures were most common from 2 months to 5 years (58%). Febrile seizures (40%) followed by epilepsy (30%) were common etiologies in the present study. GTCS (50%) was the most type of presentation, of which tonic-clonic type was highest (32%). Status epilepticus was also seen (4%). Fever was the predominant trigger (25%). Leukocytosis (45%), CRP (14%). Hypocalcaemia (30%), and Hyponatremia (9%) were present. The children who had EEG abnormalities underwent neuroimaging of which only 10% of children had radiological findings. Seizures are more common below 5 years of age. Febrile Seizures is the most common aetiology. Regular EEG Screening on follow up may be useful in early detection of epileptiform activity even in children previously diagnosed to have simple febrile seizures.

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INTRODUCTION

Pediatric seizures is a common neurological problem and occur in children of all ages (Durá-Travé T *et al.*, 2007). Age-specific prevalence rates are highest in the first decade of life especially below 1160

1999). Careful and detailed history and skilled approach can narrow the diagnosis to treat the child. Adequate knowledge of seizure pattern with clinical and laboratory profile can ensure a good outcome the age of two years (Sridharan R, Murthy BN,

come (Adhikari S *et al*, 2013). A seizure is a periodic disorder of movement, feeling and/or consciousness, caused by impulsive abnormal electrical movement in the cerebral cortex (King M *et al*, 1998). Fever, electrolyte imbalance, head trauma, and infection are the common reasons for seizures most of the times in children. Among them, less than one-third of the reported seizures are categorized as epilepsy (Sridharan S 2002). Two or more unprovoked seizures with an interval of at least 24 hours between them are defined as epilepsy (Fisher *et al*, 2014; Martin JB, Jacqueline AF 2000). Determining the aetiology of established epilepsy plays a significant role in treatment planning and

prognosis. According to the World Health Organization (WHO), of the 50 million people with epilepsy worldwide, 80% reside in developing countries (Geneva, 2006). In most of the countries, the prevalence rate ranges from 4 to 10 in 1000 general pediatric population including in India (Luengo A *et al.*, 2001). Most of the prior studies reported in the literature had paid attention to epilepsy and clinical seizure types. There is limited data on the causes of an episode of seizure in developing countries like India. The characteristics of this entity have not been thoroughly studied especially in Tamil Nadu pediatric population. Hence, this retrospective study was aimed to find the common aetiology of seizure and clinical characteristics of seizure types in different age groups presenting to tertiary centre in Southern India.

METHODS

This is a hospital-based retrospective study conducted in the Department of Pediatrics, Saveetha Medical College, Thandalam, Tamil Nadu, India. Children presenting with seizures to the Department of Pediatrics within the study period of January-June 2017 were included in the study. A total of 50 children in the age group of 2 months to 16 years were admitted in the Pediatric Department, during the 6 months study period. Neonatal seizures, children with traumatic brain injury, children who were admitted for other complaints but developed seizures after hospitalization were excluded.

Patient information was obtained from the medical records and noted as categorical variables, expressed in absolute counts and percentages for which descriptive analysis was done. Patient information collected were age, sex, details of seizure including the type, duration and presence of loss of consciousness along with clinical presentations like up rolling of eyeballs, fever, drooling of saliva, deviation of angle of mouth, vomiting, diarrhoea, drug intake, history of previous prolonged medication, involuntary movements and headache; followed by laboratory test results of white blood count, C-reactive protein, serum electrolytes, serum calcium, blood sugar along with duration and course during hospital stay. Reports of Cerebrospinal fluid (CSF) analysis, neuro-imaging which were done were recorded. All children underwent Electroencephalography (EEG) after 2 weeks as per protocol which was analysed. All the data was tabulated in Excel sheet (MS office, USA). The entire data was divided based on age into three groups (2 months to 5yrs; 6 to 10yrs and 11 to 16 yrs). Seizures were classified based on ILAE (INTERNATIONAL LEAGUE AGAINST EPILEPSY) 2017 classification (Fisher RS *et al.*, 2017) and descriptive statistical analysis was done.

Ethical Approval: Ethical approval has been received from Institutional Ethics Committee, Saveetha University; (No: SMC/IEC/2017/337)

RESULTS

Total of 50 children was admitted in the age group of 2 months to 16 years of age during the 6 month study period. The mean age of the study population was 5.8 ± 3.1 months. There were 49% (29) males and 51% (26) females with a male: female ratio of 1:1. Younger age group was found to be more affected than older children. The distribution of children in various age groups was 2 month to 5 yrs 58%, 6 to 10 years 19% and 11 to 16 yrs was 23% as shown in Table 1.

Generalized tonic-clonic seizures were the most common seizure type in our study. Of which, the tonic-clonic presentation was the highest constituting of 32% followed by tonic seizures (20%). There was a single case of myoclonic seizure and infantile spasms each in the present study. 40% of children had focal seizures and 10 % had focal seizures progressing to bilateral tonic-clonic seizures. Status epilepticus was present in (4%) of children as depicted in Figure 1

Classification

Fever was most commonly seen symptom among all the children presenting with seizures (26 patients) followed by up rolling of eyeballs (17 patients). In children presenting with GTCS, (22 patients) fever was the predominant associated symptom; whereas abnormal body perceptions including posturing, blinking, automatisms were predominant in children with focal onset of seizures as seen in Table 2.

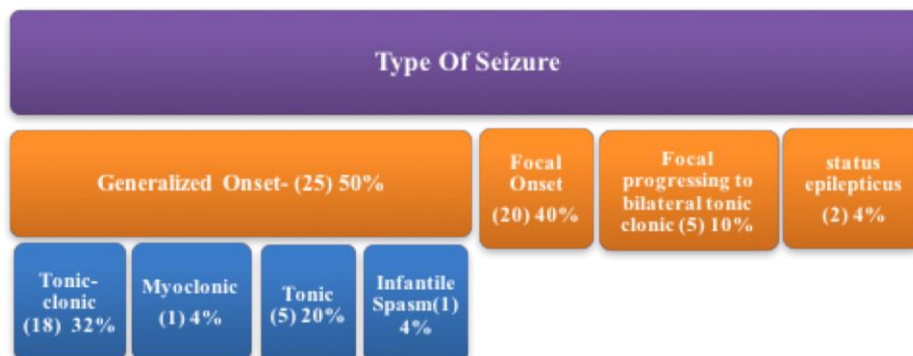
Leukocytosis (Neutrophilic) (45%) followed by hypocalcemia (30%) were the most predominant laboratory findings, followed by CRP which was positive in 14% of children presenting with seizures in the present study. Apart from this, CSF analysis was done where indicated like in children with 1st episode of febrile seizure, atypical/complex febrile seizures and when intracranial infection was suspected. So, in total 15 children underwent CSF analysis. Of which, 1 child (2%) was diagnosed to have acute bacterial meningitis (figure 2).

In the present study population, 36% patients had febrile seizures, 32% had epilepsy, 2% had CNS infection, 14% had seizures due to metabolic causes and 16% children had seizures of unknown aetiology (Table-3)

Of the 50 children, 18 had febrile seizures, 8 children had fever-triggered seizures. Among the 18 febrile seizures cases, 4 were complex febrile seizures and 14 were simple febrile seizures. As per departmental protocol, children with seizures are

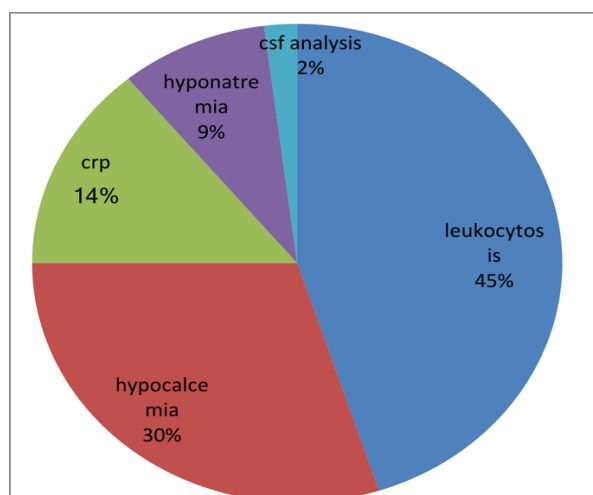
Table 1: Demographic distribution of the study population

Variables	No. of cases	Percentage	
SEX	Male	24	49%
	Female	26	51%
AGE GROUP	2 m- 5 y	29	58%
	6 y -10 y	9	19%
	11 y-16 y	12	23%

**Figure 1: Distribution of study population based on seizure type by ILAE 2017 classification****Table 2: Associated clinical presentations in generalized and focal onset seizures**

Associated clinical presentations	Total number	In generalized onset	In focal onset
Fever	26	22	4
Vomiting	9	7	2
Headache	4	3	1
Drooling of saliva	8	7	1
Uprolling of eyeballs	17	11	6
Abnormal body perception (posturing, blinking, automatisms)	15	2	13

reviewed at 2 weeks after discharge when EEG is performed. Out of 50 children, 48 children came for follow up at two weeks after discharge. EEG abnormalities were identified in 2 children with simple febrile seizures and 3 children with complex febrile seizures. Of the children with suspected epilepsy 10 had epileptiform changes in EEG. 31.2 % of children had EEG abnormalities. Neuroimaging was done as required though only 10% of children had radiological findings.

**Figure 2: Lab profile during a hospital stay****Table 3: Etiological Distribution of children in the present study**

Etiological Diagnosis	Number of Patients (%)
Febrile seizures	18(36%)
Epilepsy	16(32%)
CNS Infection	1(2%)
Metabolic	7(14%)
Unknown	8(16%)

DISCUSSION

Most of the studies showed that younger children had a higher incidence of seizures when compared to older children. Similarly, the results from the present study showed that children between 2 months and 5 years (58%) showed the highest occurrence of seizures than the other age groups of children. Males had a higher prevalence rate of seizures compared to females in studies reported by Chen *et al.*, 2010 and Martindale *et al.*, 2011. However, in the present study gender difference was not observed; male and females were equally affected.

A recent study was done by Ernestina Ernest Mwipopo *et al.*, 2016 showed that febrile seizure was the commonest etiological diagnosis of sei-

zures which is similar to current study findings (Table-3). Most studies show generalized seizures are much more common compared to partial seizure (Chen CY *et al.*, 2010; Basu S *et al.*, 2007). Similarly, the present study showed that generalized onset (GTCS) seizures were the commonest seizure type (figure-1). Partial seizure (focal onset) was noticed in 40% of the study population. 10% of children with focal onset seizures, developed bilateral tonic-clonic seizures (secondary generalization) later. Association of various symptoms was present between the generalized onset and focal onset and it was explained in Table-2. The present study found that fever was the predominant trigger for seizure (table-2). Similar findings were reported by Adhikari *et al.*, 2013 and Specchio *et al.*, 2011. The other associated symptoms found the present study were up rolling of eyeball, abnormal body perception and drooling of saliva. These symptoms are seemed to be significant in children affected by focal onset seizures (Azhar Omeran *et al.*, 2017; Al-Thahab, 2018).

It has been reported that meningitis and encephalitis are common reasons for childhood mortality and morbidity (Idro R *et al.*, 2008). In the present study, only 2% of the patients reported with meningitis and these results were in agreement with a prior south Indian study done by Murthy *et al.*, 2008 and Mwipopo EE *et al.*, 2016 study.

In this study, leukocytosis (45%) and positive C-reactive protein was (14%) reported. Similar blood count abnormalities and inflammatory markers suggestive of infection were found in Norah A *et al.*, 2005.

In the present study, only 9% of the subjects showed hyponatremia. Similar uncommon and minor electrolyte abnormality was found in Norah A *et al.*, 2005 study while Farrer *et al.*, 1997 reported that hyponatremia to be the cause of seizures in 70% of infants younger than 6 months. In the present study, we found 30% of the patients with seizures had hypocalcaemia. Similar hyponatremic and hypocalcaemia association with seizure was found in Hirtz D *et al.*, 2000 study.

Generally, EEG is considered of limited value in febrile seizures even during follow up as evidenced by various studies. In a study done by Udani *et al.* (21), few febrile seizure children showed EEG abnormalities with majority seen in complex febrile seizure cases. Similarly, in our study, EEG done at 2 weeks after discharge from the hospital during follow up. It was found that even children previously diagnosed to be simple febrile seizures also showed EEG abnormalities which suggest that EEG screening for all seizure disorder children on review may be useful for early detection of underlying epileptiform activity even in febrile

seizure cases. Neuroimaging was done as required though only 10% of children had radiological findings (Rasool A *et al.*, 2012).

Limitations of the study: The considered limitations of the study were the small sample size and the findings of this study were not reflective of the general population as it was a single tertiary care centre study. Therefore, Multi-centric prospective studies with larger sample size are recommended to overcome these limitations.

CONCLUSION

Seizures are more common below 5 years of age. Febrile Seizures is the most common etiological diagnosis. Regular EEG Screening on follow up may be useful in early detection of epileptic form activity even in children previously diagnosed to have simple febrile seizures.

REFERENCES

- Adhikari S, Sathian B, Koirala DP, Rao KS. Profile of Children admitted with seizures in a tertiary care hospitals of Western Nepal. *BMC Pediatr* 2013; 13: 43.
- Al-Thahab, Azhar Omran and Al-Awsi, Ghaidaa Raheem Lateef, 2018. Detection of helicobacter pylori in pregnant women by stool culture method, *biochem. cell. arch.* vol. 18, no. 1, pp. 49-54.
- Azhar Omeran Al-Thahab, and Ghaidaa Raheem Lateef Al-Awsi, 2017. Relationship between H. pylori infection and IL-1 β polymorphism in pregnant women, *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 8 (4) P.858-866.
- Basu S, Ramachandran U, Thapliyal A: Clinical profile and outcome of pediatric neuro-cysticercosis: A study from Western Nepal. *J Pediatr Neurol* 2007; 5:45-52
- Chen CY, Chang YJ, Wu HP: New-onset Seizures in Pediatric Emergency. *Pediatr Neonatol* 2010, 51(2):103-111.
- Durá-Travé T, Yoldi-Petri ME, Gallinas-Victoriano F. Epilepsy in children in Navarre, Spain: epileptic seizure types and epileptic syndromes. *J Child Neurol* 2007; 22:823-8.
- Fisher *et al.* ILAE official report: a practical clinical definition of epilepsy. *Epilepsia* 2014; 55:475-82.
- Fisher RS, Cross JH, D'souza C, French JA, Haut SR, Higurashi N, Hirsch E, Jansen FE, Lagae L, Moshé SL, Peltola J. Instruction manual for the ILAE 2017 operational classification of seizure types. *Epilepsia*. 2017 Apr 1;58(4):531-42.

- Fraser CL, Arieff AI. Epidemiology, pathophysiology, and management of hyponatremic encephalopathy. *American J Med* 1997; 102:67-77.
- Geneva: World Health Organization; 2006. WHO. Neurological Disorders: Public Health Challenges.
- Hirtz *Det al.*, Practice parameter: Evaluating a first non-febrile seizure in children. *Ame Academy Neurol* 2000;55:616-23.
- Idro R, Gwer S, Kahindi M, Gatakaa H, Kazungu T, Ndiritu M, Maitland K, Neville BG, Kager PA, Newton CR. The incidence, aetiology and outcome of acute seizures in children admitted to a rural Kenyan district hospital. *BMC Paediatrics* 2008 8(1):5.
- King M, Newton M, Jackson G, Fitt G, Mitchell L, Silvapulle M, Berkovic S. Epileptology of the first-seizure presentation: a clinical, electroencephalographic, and magnetic resonance imaging study of 300 consecutive patients. *The Lancet* 1998; 352: 1007-11
- Luengo A, Parra J, Colas J, Ramos F, Carreras T, Fernández-Pozos MJ. Prevalence of Epilepsy in Northeast Madrid. *J Neurol* 2001; 248: 762-7.
- Martin JB, Jacqueline AF. Management of epilepsy in adolescents and adults. *Lanset* 2000; 356: 323-29.
- Martindale JL, Goldstein JN, Pallin DJ: Emergency department seizure epidemiology. *Emerg Med Clin North Am* 2011; 29(1):15-27.
- Murthy JMK, Yangala R: Acute symptomatic seizures-incidence and etiological spectrum: a hospital-based study from South India. *Seizure* 1999; 8:162-5.
- Mwipopo EE *et al.*, Profile and clinical characterisation of seizures in hospitalised children. *Pan Afr Med J* 2016;24:313.
- Norah A *et al.*, Clinical profile of admitted children with febrile seizures. *Neurosci* 2005;10(1): Page no
- Rasool A, Choh SA, Wani NA, Ahmad SM, Iqbal Q. Role of electroencephalogram and neuroimaging in first onset afebrile and complex febrile seizures in children from Kashmir. *J Pediatric Neurosci* 2012;7(1):9.
- Specchio N, Fusco L, Vigevano F. Acute-onset epilepsy triggered by fever mimicking FIRES (febrile infection-related epilepsy syndrome): the role of protocadherin 19 (PCDH19) gene mutation. *Epilepsia* 2011; 52:e172-5.
- Sridharan R, Murthy BN. Prevalence and pattern of epilepsy in India. *Epilepsia* 1999; 40: 631-6.
- Sridharan S. Epidemiology of epilepsy. *Curr Sci* 2002; 82:664-70 5.
- Udani V. Pediatric epilepsy-an Indian perspective. *Indian J Pediatrics* 2005; 72(4):309-13.