

STUDY OF CLINICO ETIOLOGICAL PROFILE OF SEIZURES IN CHILDREN AGED 1 MONTH TO 5 YEARS ADMITTED IN PEDIATRIC DEPARTMENT

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Abstract

Background: Objective: Seizure is one of the common serious neurological problems prevalent in childhood. Incidence is highest in children less than 3 years with decreasing trend in older children. The current study is aimed to find out various etiologies of seizures and clinical seizure types in children between 1 month to 5 years' age group and also the primary outcome of acute seizures. **Materials and Methods:** Study Design: A Hospital-based observational study Study Period: 18 months (February 2021 to July 2022) Sampling Method: Convenience sampling method Source of Data: 1 month to 5 year age group children with seizures admitted in government general hospital Srikakulam. **Results:** The most common cause of seizures in our study was Febrile Seizures, seen in 40.7%, followed by epilepsy seen in 24.3% and Viral Encephalitis, seen in 12.1%. Pyogenic meningitis in 5%, tubercular meningitis in 3.58%, Hypo calcemic seizures seen in 2.86%, and hypoglycemic seizures in (2.14%). The other causes were neurocysticercosis (1.43%) and others (7.14%). In our study, 90.7% of children were discharged, 2.14% succumbed to their underlying condition, 3.57% were referred to other institutions and another 3.57% of children left against medical advice. **Conclusion:** The causes of seizures in children are varied. A detailed history, thorough examination and requisite investigations help to delineate the underlying cause, which can be treated accordingly.

INTRODUCTION

Seizures are the most common neurological problem encountered in children and are often a frightening experience for parents. A seizure is defined as a 'transient occurrence of signs and/or symptoms due to abnormal excessive or synchronous neuronal activity in the brain'.^[1] Convulsion is classically used to refer to the motor manifestation of seizures. Seizures are common causes of hospitalization in children leading to significant mortality and morbidity. The incidence is highest in children of age less than 3 years.^[2] Seizures account for two per cent of children's emergency department visits.^[3] The clinical spectrum of seizures includes focal and generalized seizures. Generalized seizures arise from the bilateral hemispheres of the cortex. In contrast, focal seizures arise from one region or hemisphere of the brain.^[4] Most seizures in children are provoked by somatic disorders originating outside the brain like high fever, infection, syncope, head trauma, hypoxia, toxins and cardiac

arrhythmias. A remote symptomatic seizure is considered to be secondary to a distant brain injury, like an old stroke. Reflex seizures are usually precipitated by a sensory stimulus like flashing lights.

Children with epilepsy, particularly infants, differ from adults not only within the clinical manifestations of their seizures, but also in the presence of unique electroencephalogram (EEG) patterns, etiologies, and responses to antiseizure drugs. The immature brain, particularly in neonates and young infants, differs from the adult brain within the basic mechanisms of epileptogenesis and propagation of seizures. It is more prone to seizures, but

seizures are more likely to disappear when the child grows.

In most cases, febrile seizures are the foremost common type seen in the pediatric population and account for a majority of seizures in younger children of age below 5 years.^[4] Most febrile seizures are simple with approximately 20–30%

being complex. There is evidence that febrile seizures are associated with an increased risk of subsequent epilepsy, which develops in 2 to 4% of children with a history of febrile seizures.

One-third of seizures in children are caused by epilepsy, a condition in which seizures are triggered recurrently from within the brain.^[5]

Seizures may signal a potentially serious underlying systemic or central nervous system disorder that requires thorough investigation and management. It is thus imperative to know the general causes of pediatric seizures.

Available data is limited on acute seizure episodes from developing nations. Hence this observational study is being conducted to study the etiological profile of children 1 month to 5 years of age admitted to the pediatric department, government general hospital, Srikakulam.

Aims & Objectives of The Study

1. To study demographics and clinical seizure types in children with seizures
2. To study causes of seizures in children of age 1 month to 5 years admitted in the pediatric department, government general hospital, Srikakulam.

The primary outcome of seizure.

MATERIALS AND METHODS

Source of Data: The study was conducted in 1-month to 5-year children with seizures admitted to the pediatric department, government general hospital, Srikakulam.

Study design: A hospital-based Observational study.

Study Period: February 2021 to July 2022.

Sampling method: Convenience sampling method

Sample size: 140. (All admitted cases with seizures during the study)

Method of Collection of Data

140 cases admitted to the hospital in the age group of 1 month to 5 years with seizures were selected for the study after informed consent from the parents or caregivers at the time of admission. Age and gender noted.

Detailed history regarding seizure including aura, type of seizure, timing, duration, frequency, associated symptoms like fever, headache, vomiting, cough, ear discharge, postictal phase, neurodevelopmental history, past history, and history of any illicit drugs, emphasizing conditions like infection, trauma, and family history were noted. Children were subjected to detailed clinical, physical and neurological examination including meningeal signs, and neurological deficit. Children were subjected to investigations as per protocol and indication. Seizure type classification was based on the Commission on Epidemiology and Prognosis, International League against Epilepsy 2017. 19

The primary outcome of acute seizure was recorded in four categories: Discharged, left against medical

advice (LAMA), succumbed to disease (mortality) and referred to other institutions.

Inclusion Criteria

1. All children aged 1 month to 5 years admitted with seizures (based on history at home witnessed by attenders or seizures during hospital stay)

Exclusion Criteria

1. Children readmitted with the same cause of seizures
2. Children with a head injury
3. Children with incomplete data.

Statistical techniques used

The data were entered into Microsoft Excel Worksheet and were analysed using simple calculations. Descriptive statistics like frequencies and percentages were calculated. The following investigations were done in a stepwise manner depending on the clinical presentation and need.

1. Complete hemogram
2. C-reactive protein
3. Serum sodium, potassium, chloride and calcium.
4. Blood sugar levels.
5. Blood culture and sensitivity.
6. Cerebrospinal fluid analysis, when indicated.
7. EEG when indicated.
8. Mantoux test and Chest x-ray, when needed.
9. CT scan when indicated.
10. MRI scan when indicated.

Ethical Clearance was taken from the institute for this study.

RESULTS

The above table shows the types of seizures seen in our present study. Generalized seizures were the most common type and were seen in 132 cases (94.3%). Focal seizures were seen in 8 cases (5.7%). Of all generalized seizures, GTCS was the most common subtype

This study group consists of 140 children between 1 month to 5 years age group. Out of 140 cases, 76 cases (54.3%) were males and 64 cases (45.7%) were females with male preponderance in our study. The highest incidence of seizures was seen in the age group 1 to 3 years with 59 cases (42.2%). There were 31 (22.1%) and 50(35.7%) cases respectively in age groups

of 1 month to 1 year and 3 to 5 years.

Symptoms Associated with Seizures

The table and figure show the symptoms associated with seizures in our study. Fever was the commonest symptom, seen in 95 cases (67.85%) of the total 140 cases, followed by altered sensorium in 50 cases (35.7%).

several cases with a significant history of seizures in the past. 40 children (28.6%) had a past history of seizures, while 100 children (71.4%) did not have a history of seizures in the past. 13 children had a developmental delay (9.3%). 127 children (90.7%)

children had a normal development history Out of 140 cases with seizures, 50 cases had altered sensorium. Neurological deficit was elicited in 7 cases (5%) and signs of meningeal irritation (Neck stiffness and/or Kernig's sign and/or Brudzinski's sign) were elicited in 17 cases (12.14%).

Out of the total 140 cases, 7 cases (5%) had abnormal findings on fundoscopy like papilledema and optic atrophy.

Hypocalcemia (<8.0mg/dl) was seen in 4 cases (2.85%). 136 children (97.15%) had normal calcium levels

Hypoglycemia (less than 40 mg/dl) was seen in 3 cases that account for 2.14%

Of all 140 cases, CSF analysis was done in 40 cases, of that, 11 cases reported abnormal CSF values like CSF to serum glucose ratio is less than or equal to 0.5 (hypoglycorrhachia), pleocytosis, which accounts for 27.5% of 40 cases. 4 out of 11 cases had neutrophilic predominant pleocytosis and 7 cases had lymphocyte- predominant pleocytosis. CSF culture is positive for 2 cases. Low glucose levels were seen in 8 cases, and protein level in CSF was elevated in 9 cases.

EEG was done in 75 cases in our study. Out of these, 40 cases showed abnormal EEG patterns like Generalised spike and wave pattern, temporal spike and wave pattern and hypsarhythmia were seen

CT scan was done in 56 cases and abnormalities were seen in 44 cases, such as Cerebral oedema in 15 cases (26.8%) basal exudates in 5 cases (8.92%), subdural collection in 3 cases., Hydrocephalus 4 cases, Infarct 3 cases. Other features like cerebral atrophy and fracture of cranial fossa, HIE changes in 14 cases (25%)

Etiology of Seizures

This table shows the various etiologies of convulsions in our study. The most common cause of seizures in our study was Febrile Seizures, seen in 57 cases (40.7%), followed by epilepsy (24.3%), viral encephalitis (12.1%) and pyogenic meningitis (5%).

Out of the 140 children, 127 recovered (90.7%). 3 children (2.14%) succumbed and 5 children were referred (3.57%). 5 other children (3.57%) left against medical advice (LAMA).

Table 1

TYPE OF SEIZURES	NO. OF CASES	PERCENTAGES (%)
Generalized	132	94.3
Focal	8	5.7 %

Table 2

SYMPTOMS	NO OF CASES	PERCENTAGE S (%)
Altered Sensorium	50	35.7
Fever	95	67.8 5
Cough	30	21.4 2
Headache	10	7.14
Vomiting	35	25
Irritability	30	21.4 2
Lethargy	24	17.1 4
Ear Discharge	9	6.42

Table 3

ETIOLOGY	NO OF CASES	PERCENTAGES (%)
Febrile Seizures	57	40.7
Epilepsy	34	24.3
Viral encephalitis	17	12.1
Pyogenic meningitis	7	5
Tubercular meningitis	5	3.58
Hypo calcemic	4	2.86
Hypoglycemic	3	2.14
ICSOL	2	1.43
OTHERS	10	7.14

DISCUSSION

Type of Seizure

In the present study, Generalized seizures were the most common type of seizure present in 132 cases out of 140 cases that account for (94.3%) and focal seizures in 8 cases (5.7%).

The majority of the studies show generalized seizures are much more common when compared to partial seizures, and generalized tonic-clonic seizures are the most common subtype. A comparison of type seizures was described in the below table with other studies.

Chen CY, et al,^[7] in their study of 319 cases, reported an incidence of generalized seizures in 75% of cases and focal seizures were seen in 5% of cases. A study done by Ashraf M et al,^[8] with a sample size of 72 cases reported an incidence of 73.6% of generalized seizures and 23.6% of focal seizures. Gogoi et al,^[9] in a study of 65 children, reported a 90.7 % incidence of generalized seizures compared to a 9.3 % incidence of focal seizures.

In a study by Saravanan S,^[10] 41% of children presented with focal seizures and 59% had generalized seizures, of which GTCS was seen in more than two third children.

In a study by Dugar et al,^[11] out of 176 cases, 78 cases (44.32 %) had generalized tonic-clonic seizures, while 30 cases (17%) had focal seizures. myoclonic seizure cases were 11(6.25%).

Generalized tonic-clonic seizures were also the commonest seizure type in separate studies by Adhikari et al,^[12] (69.9%) and Inaam NM et al,^[13] (66.7%) respectively.

In a study conducted on 100 cases by Chandini, et al,^[14] generalized seizures were the most common type with a reported incidence of 94% out of 100 cases, while focal seizures account for only 6%.

GENDER DISTRIBUTION OF SEIZURES

Out of 140 cases in our study, 76 cases (54.3%) were males and 64 cases (45.7%) were females. One of the reasons for this could be the increased prevalence of febrile seizures among male children.

A study by Gogoi et al,^[9] on 65 cases, reported an incidence of seizures in 40 males and 25 females corresponding to 61.5% of males

In a study by Bharathi M et al,^[14] there was a male preponderance of about (61%) out of 200 cases

Comparable results were obtained with studies by Adhikari et al,^[12] (comprising 338 males and 213 females) and Dugar et al,^[11] (100 males and 76 females)

INCIDENCE OF SEIZURES IN DIFFERENT AGE GROUPS

The incidence of seizures is highest in children aged less than 3 years of age, with a decreasing frequency in older children.

In our study, the highest incidence of seizures was seen in the age group 1 to 3 years of age, with 59 cases (42.14%), followed by 50 cases

(35.7%) and 31 cases (22.1%) respectively in 3 to 5 years and 1 month to 3 years.

The higher incidence in young children may be due to an increased incidence of febrile seizures.

In a study by Chen CY et al,^[7] 319 children were taken up to the age of 18 years. Of which, the highest number of cases 237 were seen in the age group of 1-6years, followed by 62 cases in less than 1 year of age, 10 cases in the age group of 7-12years and 10 cases in the 13-18 years age group.

In a study by Saravanan S,^[10] of 520 children, the incidence of seizures among different age groups was 1 month to 1 year 29.2% (152), 1-3 years 27.3 % (142), 4-6 years 18.1% (94) and 7 to 12 years was 25.4% (122).

In the study by Dugar et al,^[11] It was seen that out of the total 176 cases, 116 cases (65.90%) belonged to the 1-5yrs age group.

In the study by Gogoi et al,^[9] among 65 children in the study group, there were 12 children (18%) in the age group 1-6 months, 41 children (64%) between 6 months of age to 5 years and 12 children (18%) were above the age of 5 years which indicates the highest number of cases were recorded in the age group of 6months to 5 years.

A study by Adhikari et al,^[12] was done on 551 children aged between 6 months till 15 years of age. Of that 317(57.5%) were in the age group 6 months to 5 years.

In a similar study by Chandini, et al. in 100 children, the incidence is highest among 1-3years (42), 3 to 5 years (36), and 1 month to 1 year (22).

In a study by Bharathi M et al,^[14] highest number cases of about 84 were in the age group of 1m-1yr followed by 70cases in the 3yr-5yr age group and the least in the age group of 1-3years 46(23%).

SYMPTOMS ASSOCIATED WITH SEIZURES

In our study, fever was the commonest symptom, seen in 95 cases (67.85%) followed by altered sensorium seen in 50 cases (35.7%) and vomiting in 35 cases (25%), cough (21.42%), irritability (21.42%), lethargy (17.14%), headache (10%). Ear discharge was seen in 9 cases (6.42%).

Chen CY et al,^[7] in a study over 2 years on 319 children, 213 had a fever which accounts for 71% and 29% of cases did not have a fever.

Fever was present on admission in 45 (69.2%) of the children in the study by Gogoi et al.^[9]

Similarly, fever was a consistent feature present in 77.27% of cases in the study by Dugar et al.^[53]

Among 551 children in the study group by Adhikari et al,^[12] 317 (57.5%) were in the age group 6 months to 5 years. Fever was present on admission in 295 (53.5%) children.

In a study by Chandini et al,^[56] fever was the commonest presenting complaint with 68%, followed by altered sensorium in 36% of cases, vomiting in 25% of cases, followed by lethargy, irritability, gastroenteritis and jaundice.

In a study of 200 cases by Bharathi M et al,^[57] fever was a common finding seen in 77% of total cases, altered sensorium in 41.5% of cases, vomiting in

29%, cough in 21.5%, irritability in 18%, lethargy in 11%, followed by headache and ear discharge in 7.5% and 6.5% of cases respectively.

PAST HISTORY OF SEIZURES

In our study, 40 children (28.6%) had a past history of seizures, while 100 children (71.4%) did not have a significant history of seizures.

This might be because epilepsy and febrile seizures tend to be associated with recurrent seizures. Febrile seizure was the commonest cause in our study. Risk factors for the recurrence include less than one-year age group, duration of fever less than 24hrs, positive family history, male gender, complex febrile seizures, low sodium at presentation

The study by Bharathi M et al,^[57] had a 23% positive history of seizures in the past out of 200 cases studied.

Positive history of seizures was noted in 28% of cases (28 out of 100) in a study by Chandini et al,^[56]

FAMILY HISTORY OF SEIZURES

In the present study, 17 cases (12.1%) had a positive history of seizures in the family, out of which 15 cases had febrile seizures and 2 had a history of seizure disorder/ epilepsy.

In a study by Chen CY et al,^[7] a total of 32 cases had a positive history in the family of which, 6 cases had a history of epilepsy.

A study on hundred children by Chandini et al⁵⁶ had a history in the families in 12 cases (12%).

Bharathi M et al,^[57] reported 9% of children had a significant history in 200 cases taken in the study

In a study by Veisani Y et al,^[16] there was 28.8% of positivity of febrile seizures in the families, of that 36.2% had a history of simple febrile seizures and 29.4% had a complex type of febrile seizures

Most of the cases in children tend to be familial or appear to occur with a positive family history, thereby supporting the heredity role in the genesis of an epileptic phenomenon in the first 2 years of life.

DEVELOPMENTAL HISTORY

In the present study out of 140 children, 13 children had a history of developmental delay (9.3%) and 127 children had a normal history of development that accounts for 90.7%.

9 children (2.8%) had a history of developmental delay in the study by Chen CY et al,^[7] In a study by Chandini et al ⁵⁶ 9 children had a history of developmental delay out of 100 children.

Normal history of development was seen in 95% of cases in the Bharathi M et al,^[57] study and 5% of children had abnormal developmental history out of a total of the 200 cases studied.

NEUROLOGICAL SIGNS

Of the 140 cases, 35.7%(50) cases had altered sensorium, 12.14%(17) had signs of meningeal irritation, the neurological deficit was elicited in 5%(7) children and 5% (7) had abnormal findings on fundoscopy.

In a study by Dugar et al,⁵³ amongst a variety of neurological findings observed in the study, altered sensorium ranging from drowsiness to deep coma, was present in 59 cases (33.35%) and 35 cases

(19.7%) had nuchal rigidity, Kerning's and Brudzinski's signs suggesting meningeal involvement.

In a study by Chandini et al⁵⁶ done on 100 children, 36% had altered sensorium, 5% had a focal neurological deficit and 12% had signs of meningeal irritation.

44.5% of children had altered sensorium, 27% had meningeal irritation signs and 3.5% of children had a focal neurological deficit Bharathi M et al,^[57] studies.

In a study of tubercular meningitis children by Israni et al,^[17] out of 47 children, 29 (62%) presented with advanced disease, and the common sign was meningism.

INVESTIGATIONS

CSF ANALYSIS

In our study, lumbar puncture was done in 40 cases and CSF analysis was done. CSF abnormalities were seen in 11 cases (27.5%) like pleocytosis, hypoglycorrhachia, and elevated CSF Protein.

In the study by Chen CY et al,^[7] CSF analyses were done in 60 cases. Among them, 6 cases had abnormal findings like pleocytosis and elevated CSF protein levels.

In the study by Dugar et al,^[53] amongst 8 cases of pyogenic meningitis, 5 cases (62.5%) had shown an increase in CSF protein with decreased sugar levels. while in 3 cases (37.50%) protein was increased though sugar was normal. Low sugar and high protein, pathognomonic of pyogenic meningitis.

Among 551 children in a study by Adhikari et al,^[12] CSF analyses were done in 317 cases. Abnormal reports were seen in 82 cases. Out of that 42 were seen between 6 months and 5 years of age.

Analysis of CSF fluid was done in 56 cases of 100 in Chandini et al,^[56] 21 cases had abnormal CSF findings.

Bharathi M et al,^[57] conducted lumbar puncture studies in 200 cases. 86 cases showed low protein, 114 cases had increased protein and 61 cases had pleocytosis.

ELECTROENCEPHALOGRAPH (EEG)

EEG was taken in 75 cases in the present study. Abnormal findings were seen in 40 cases out of 75 cases.

Ashraf M et al,^[8] conducted EEG studies in 72 cases, out of that, 49 cases had abnormal EEG findings. Generalized seizures were seen in 37 cases including generalized tonic-clonic seizures (28), tonic(2), myoclonic(3), absence(3) and infantile spasms(1). Focal seizures were seen in 11 cases and 1 case is of undetermined seizures.

In the study by Gogoi et al,^[9] EEG was done on 16 children of a total of 65 and had abnormal reports in 9 (56.25%) of cases. EEG abnormality was more in the age group of 6 months to 5 years with 5 (62.5%) cases out of 8.

In the study by Dugar et al,^[11] EEG was done in a total of 172 cases of which 125 records were abnormal. All 47 normal records belonged to the group of febrile seizures.

In a study by Chandini, et al,^[14] EEG was done in 70 cases out of 100, and abnormal findings were seen in 29 cases (41%).

EEG was taken in 16 cases in a study by Bharathi M et al^[14] cases had generalized seizures and 2 had a focal type of seizures.

A single normal EEG cannot exclude epilepsy. Also, 3 % of normal children have epileptiform discharges, mainly in mid-temporal and centrottemporal situations. EEG should be ordered very individually rather than routinely in first nonfebrile seizures.

COMPUTERISED TOMOGRAPHIC (CT) SCAN

CT scan was taken in 56 cases and abnormalities were seen in 44 cases, such as cerebral oedema in 15 cases (26.8%) basal exudates in 5 cases (8.92%), hydrocephalus in 4 cases (7.14%), subdural collection in

3 cases (5.3%), infarct in 3 cases (5.3%). Other features like cerebral atrophy and fracture of cranial fossa, HIE changes in 14 cases (25%).

Study by Dugar et al,^[11] CT scans were done in 54 out of 258 children.

6 CT scans were normal while 48 had shown some organic lesions.

Study by Gogoi et al,^[9] in 65 children, 11 cases underwent CT and,^[9] had normal CT.

Study by Adhikari et al,^[54] neuroimaging was taken in 242 (43.9%) children with seizures and revealed abnormalities in 111(45.9%) and the most common finding was neurocysticercosis in 66 children.

Chandini et al,^[14] studies were conducted on 100 cases. CT scan was taken in 40 cases. 32 cases had CT scan abnormalities. Hydrocephalus in 8 cases, basal exudates in 4 cases, neurogranulomas in 2 cases, infarcts in 2 cases, oedema in 6 cases and other findings in 10 cases.

The study by Bharathi et al,^[15] in 200 cases. 65 cases underwent a CT scan. Cerebral oedema was seen in 11.5% of cases, hydrocephalus in 6.5%, basal exudates in 4.5%, and infarcts in 1.5% of cases. Other findings on CT scans were seen in 8.5% of cases.

The practice of obtaining CT scans routinely in many emergency departments for all new-onset afebrile seizures is not justified. CT scan also fails to detect small tumours with epileptogenesis in 40% of patients

ETIOLOGY OF SEIZURES

The different causes of seizures in the present study are compared to other similar studies.

Our study was done in the pediatric department of GGH Srikakulam, to determine the various causes of seizures in children aged 1 month to 5 years, in the Srikakulam district of Andhra Pradesh

The most common cause in the present study was febrile seizures, seen in 57 cases (40.7%), followed by epilepsy in 24.3%, viral encephalitis in 12.1% and pyogenic meningitis is seen in 5%

The incidence of febrile seizures in this study is comparable to other studies, which was the most

common etiological cause in this study. The differences with other studies are probably due to the inclusion criteria of other studies and different geographical areas of the study.

Febrile seizures were common in the age groups of 1 month to 1 yr and 1 yr to 3 years. Comparable results were obtained with the studies of Gogoi et al,^[9] Adhikari et al,^[54] and Chen et al,^[7]

Veisani et al,^[16] reported positive family history of febrile seizures in 28.8% of children. The overall incidence of FS recurrence was 20.9%.

SazEU et al,^[18] and Mwipopo et al,^[19] reported the incidence of febrile seizures in their studies as 66% and 87.5% respectively. A major risk factor for febrile seizures is a first or second-degree relative with a febrile seizure. Among first-degree relatives, 10 to 20 per cent of parents and siblings also have had or will have febrile seizures. If a child has a febrile seizure, the risk that his/her sibling will have a febrile seizure is 10-45%.

Viral encephalitis was the commonest cause of seizures in 3- 5 years of age in our study.

A study in New Delhi done on 151 cases with encephalopathy, 51 cases had viral encephalitis and the most common virus was Enterovirus 71 seen in 35.1 % of cases, followed by mumps, Japanese encephalitis, and measles and one case of dengue was identified.^[20]

Pyogenic Meningitis has the highest incidence in less than 1 year of age in the study. Similar incidences were reported in studies by Gogoi et al,^[9] and Bharati et al,^[15] In a study 21 of 187 patients with bacterial meningitis, seizures were seen in 13% of children.

Tubercular meningitis was seen in 5% of cases in our study. A higher incidence (8.5%) was seen in the study by Bharathi et al.^[15]

Metabolic abnormalities such as hypocalcemia and hypoglycemia were seen in 2.86% and 2.14% respectively. Sangani et al,^[7] studied seizures in the pediatric emergency department and found a 5.9% incidence of hypocalcemia and a 3.7 % incidence of hypoglycemia.

The incidence of childhood epilepsy in our study was 24.3% (34 cases). These cases were children with cerebral palsy or intellectual disability with epilepsy and developmental delay. The most common neurologic disorder associated with epilepsy is cerebral palsy.

Space occupying lesion such as neurocysticercosis is seen in 2 cases of our study. Comparable results were seen with the study of Bharathi et al.^[15] The studies by Gogoi et al,^[9] and Adhikari et al,^[11] showed higher incidence,

probably due to different eating preferences in those areas. The incidence of NCC in pediatric clinics in India is estimated to be 0.9%

THE PRIMARY OUTCOME OF SEIZURE

In our study, 127 were discharged (90.7%). 3 children (2.14%) succumbed to their underlying condition. 5 children were shifted to other centres on

request (3.57%). 5 other children (3.57%) left against the medical advice (LAMA).

Of the 3 children who died, 2 were cases of viral encephalitis, and another was a case of Bacterial Meningitis. All cases of death had refractory status epileptics, presented late to the hospital and succumbed within a few hours of admission. A similar mortality rate was seen in the reports of other developing countries. 64 In a study by Saravanan S,^[10] 86.5 % (450) of the children recovered normally, 6% recovered with the deficit, 5% were either referred or discharged against the medical advice and 3% died. Mortality was seen

mostly in the symptomatic seizures (viral encephalitis, meningitis, intracranial bleeding).

In Adhikari et al,^[54] studies, children with encephalitis and status epilepticus had poor outcome with the highest mortality while good outcome was seen in children with febrile seizures, neurocysticercosis and hypertensive encephalopathy and were discharged after recovery

A study by Dugar et al,^[11] 128 cases (72.7%) responded very well to medications, 35 cases (19.88%) showed partial response, 7 cases (4.58%) were refractory/poor response to treatment while 6 patients (3.40%) died during treatment.

Table 23: Comparison of type of seizures with other studies

STUDY	GENERALIZED SEIZURES(%)	FOCAL SEIZURES(%)
Present study	94.3	5.7
Chen CY et al ⁷	75	5
Ashraf M et al ⁸	73.6	23.6
Gogoi et a ⁹	90.7	9.3
Saravanan S ¹⁰	59	41
Durgar et al ¹¹	44.32	17
Adhikari et al ¹²	69.9	30.1
Innam et al ¹³	66.7	33.3
Chandini et al ¹⁴	94	6

Table 24: Comparison of gender distribution of seizures with other studies

STUDY	Male: female
Present study	1.4:1
Gogoi et al ⁸	1.6:1
Saravanan et al ⁹	1.36:1
Adhikari et al ¹⁰	1.58:1
Dugar et al ¹¹	1.2:1
Bharathi M et al. ¹⁴	1.56:1

Table 25: Comparison of the history of seizures with other studies

STUDY	PAST HISTORY
Present study	28.6%
Bharathi M et al. ⁵⁷	23%
Chandini et al. ⁵⁶	28%

Table 26: Comparison of abnormal EEG in different studies

STUDY	ABNORMAL FINDINGS
Present study [n=98]	40
Ashraf M et al ⁸ [n=72]	49
Bharathi M et al. ⁵⁷ [n=30]	16
Chandini et al. ⁵⁶ [n=70]	29
Dugar et al ⁵³ [n=172]	125
Gogoi et al ⁹ [n=16]	9

n= no. of cases in which EEG was done out of total cases

Table 27: Comparison of abnormal CT findings in different studies

STUDY	ABNORMAL CT FINDINGS
Present study[n=56]	44
Dugar et al ¹¹ [n=54]	48
Gogoi et al ⁹ [n=11]	9
Adhikari et al ⁵⁴ [n=242]	111
Chandini et al ¹⁴ [n=40]	32
Bharathi M et al ¹⁵ [n=65]	50

n= no. of CT scans done out of total cases

Table 28: Comparison of the aetiology with other studies

	Present study (n=140)	Saravana n S. ¹⁰ (n=520)	Gogoi et al. ⁹ (n=65)	Adhikari et al. ¹² (n=551)	Dugar et al. ¹¹ (n=258)	Bharathi et al. ¹⁵ (n=200)
Age group	1month-5yrs	1month-12yrs	1month	6month- 5yrs	1-16yrs	<5 years

			-12yrs			
Place of Study	Srikakulam Andhra Pradesh	Kanchipuram, Tamil Nadu	Dibrugarh, Assam	Pokhara, Nepal	Sangli, Maharashtra	Nellore Andhra Pradesh
Febrile Seizures	40.7%	36.5%	40%	30.5%	48.8%	34.5%
Pyogenic Meningitis	5%	8.8%	12%	6.5%	4.54%	11%
Viral Encephalitis	12.1%	3.8%	6.2%	6.7%	14.2%	20%
Epilepsy	24.3%	33.2%	12.3%	33.5%	17.04%	8%
Hypoglycemia	2.14%	0.7%	-	-	-	2%
Hypocalcemia	2.86%	0.7%	-	-	-	13%
Tb. Meningitis	3.58%	-	2.1%	1.5%	1.13%	8.5%
Intra Cranial Space Occupying Lesions	1.43%	3.8%	6.1%	12%	-	1%

*n indicates the number of study subject

CONCLUSION

Children presenting with seizures require aggressive stabilization, resuscitation and subsequent diagnostic testing, monitoring and treatment. Meticulous history taking, detailed examination and stepwise implementation of laboratory investigations, EEG studies and neuroimaging as indicated by clinical suspicion help to identify the underlying pathology of seizures.

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