A STUDY ON CLINICAL AND DIAGNOSTIC WORKUP OF FOCAL SEIZURES IN CHILDREN OF AGE GROUP 1-10 YEARS

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ABSTRACT

BACKGROUND

Epilepsy is a disorder of brain which predisposes to produce seizures. The present study is on focal seizures in which the diagnosis can be established in most of the cases and appropriate diagnosis is important for early and effective treatment, and thus complications can be decreased. We wanted to study the clinical profile and work up of diagnosis of focal seizures in children.

METHODS

This is a hospital based prospective conducted in the department of paediatrics, King George Hospital, for period of 1 year with 50 children.

RESULTS

The mean age of occurrence was 4.5 years. Male to female ratio was 1.7:1. All children had motor symptoms. Sensory symptoms were observed in only 6% of children. Focal dyscognitive seizures were the commonest type of focal seizures. Right sided (62%) focal seizures were common than left focal (38%).

CONCLUSIONS

Focal seizures with loss of consciousness was the commonest type followed by secondary generalization in focal seizures and focal seizures without loss of consciousness.

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BACKGROUND

Epilepsy is a common neurological disorder in the paediatric age group and occurs with a frequency of 5-10 /1000[1] children in a year. They were associated with psychological, cognitive, and social trauma to the parents. About 5% of children experience a seizure in the first year of life. A seizure is a transient occurrence of signs and symptoms resulting from abnormal excessive or synchronous neuronal activity in the brain.[2] Epilepsy is a common medical illness worldwide, and 0.5 to 1% of all children have epilepsy.

The present study is on focal seizures in which the diagnosis can be established in most of the cases and appropriate diagnosis is important for early and effective treatment, and thus complications can be decreased. Focal seizures are not uncommon in children. They account for 60% of epilepsies in developing countries like India[3] and zero% in developed countries. In children the focal seizures does not always denotes a localized area but also denotes secondary to genetic and idiopathic epilepsy. Sometimes the focal seizures are misdiagnosed as generalized tonic-clonic seizures type when associated with secondary convulsive movements.[4]

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There are some differences in causes of focal seizures in children of developing countries like India when compared to West. The common causes usually include glioma, cortical dysplasia, calcifications and infarcts in West, and it is mostly infections (Neurocysticercosis and Tuberculosis)[5] and stroke in India. Focal seizures are under-recognized in children. Diagnosis can be established in 40-60% of cases.[6] Imaging procedures such as CT and MRI are helpful in diagnosis. MRI is more sensitive than CT in identifying brain parenchyma lesions.[7] Therefore the imaging procedures are indicated in all children with focal seizure.

Aims and Objectives

1. To study of clinical profile of focal seizures.
2. To do work-up on the diagnosis of focal seizures.

METHODS

Study Design

A prospective interventional study.

Type of Study

Prospective study done at Andhra Medical College, King George Hospital.

Study Period

July 2017 to June 2018.

Study Sample

50

Sampling Design
Convenience sampling.

Inclusion Criteria
children in age group of 1-10 years.

Exclusion Criteria
a) Children less than 1 year.
b) Children more than 10 years.
c) Children with febrile seizures.
d) Children presenting with other type of seizures like GTCS, absence, atonic.

Children with focal seizures which is defined as per International League Against Epilepsy (ILAE) classification formed the study group. A total of 50 children were included in the study.

A detailed history with neurological examination (for neurological deficits, neurocutaneous markers) is done in all cases. All children were investigated with Mantoux, CSF analysis and Neuro imaging like CT/MRI. All the findings were noted in a proforma and results were analyzed.

RESULTS

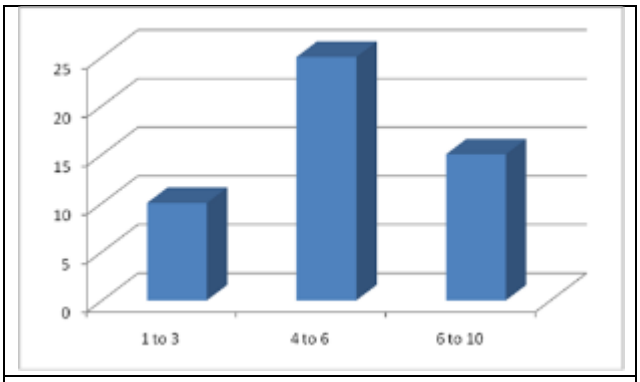

Figure 1. Age Distribution

In this study, the most common age group presented with focal seizures was 4-6 years age group with mean age of 4.5 years.

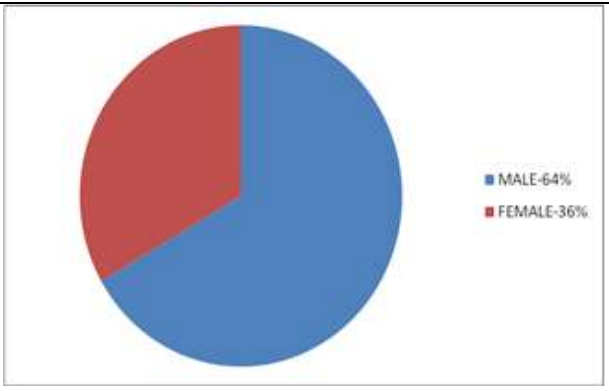

Figure 2. Sex Distribution

In this study, 32 (64%) were males and 18 (36%) were females. Sex distribution showed male preponderance with 1.7:1 ratio.

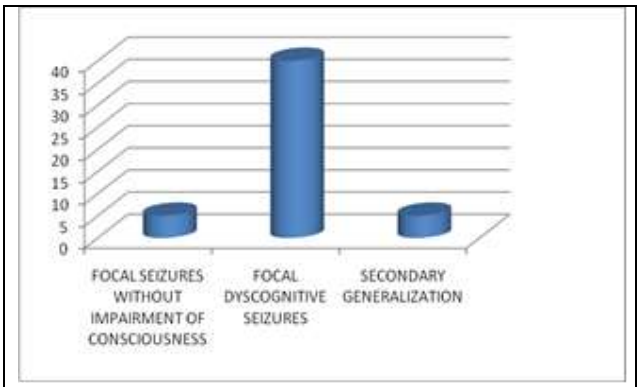

Figure 3. Seizure Semiology

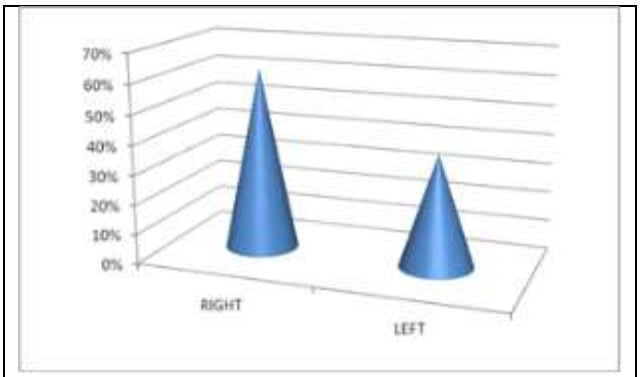

Figure 4. Type of Focal Seizures

Right sided focal seizures were seen in 62% and left sided were seen in 38% of the children.

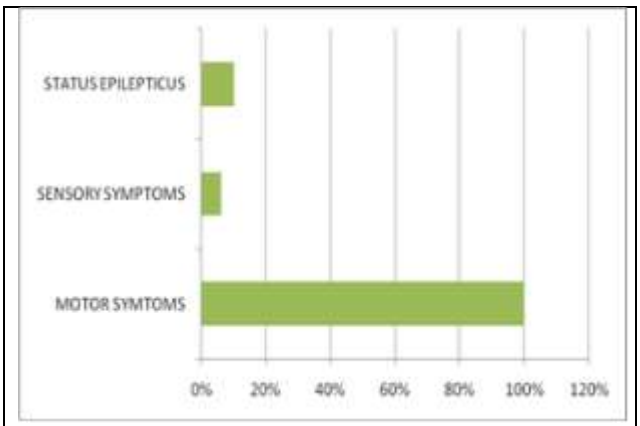

Figure 5. Symptomatology

Motor symptoms were seen in all the cases and sensory symptoms were seen in 6% of the cases and status epilepticus was observed in 10% of cases.

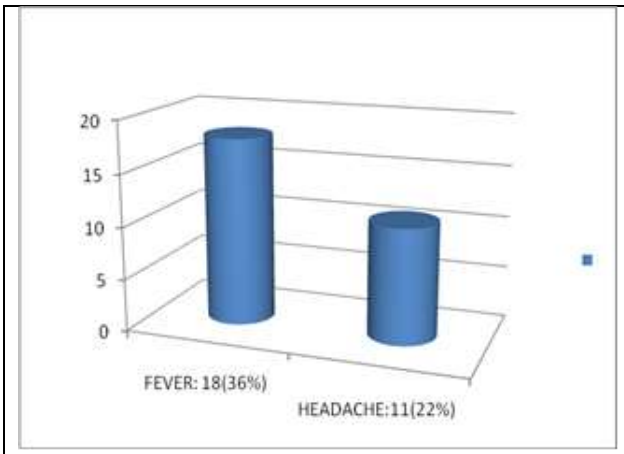

Figure 6. Fever and Headache

In this study, fever was seen in 18 cases(36%) and headache in 11(22%) of which meningitis, tuberculoma were the common causes followed by NCC.

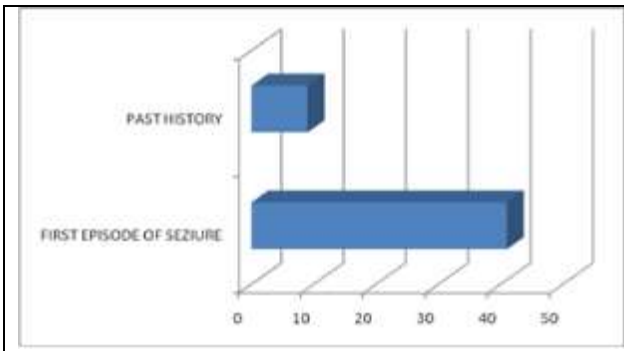

Figure 7. Past History Of Seizures

Past history of seizures was seen in 9 (18%) cases of which GTCS were seen in 2 cases and focal seizures were seen in 7 cases. TB contact history was seen in 1 case.

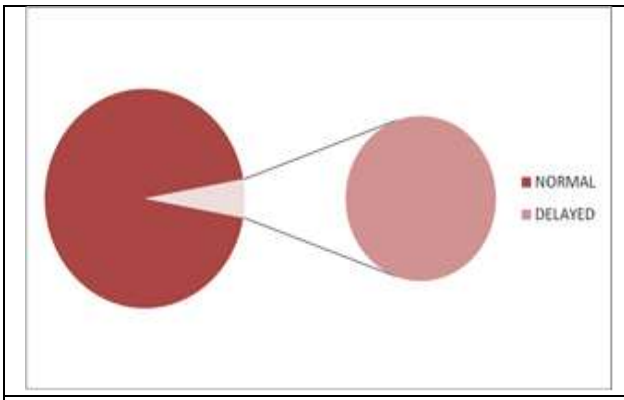

Figure 8. Developmental History

In this study, global developmental delay was observed with 3 children. They were 2 perinatal insult and 1 was Adrenoleukodystrophy.

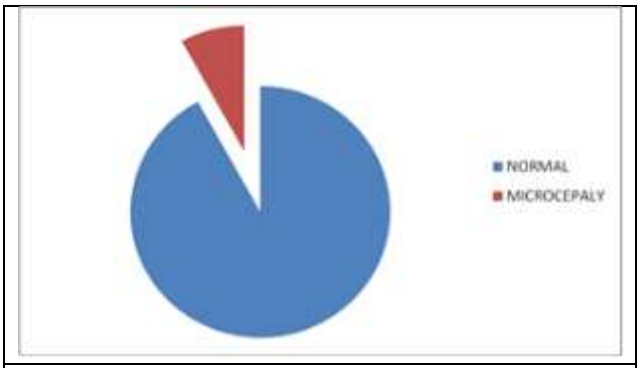

Figure 9. Head Circumference

In this study of 50 children, microcephaly which is defined as <3 SD of that mean age and sex was seen 4 cases (8%).

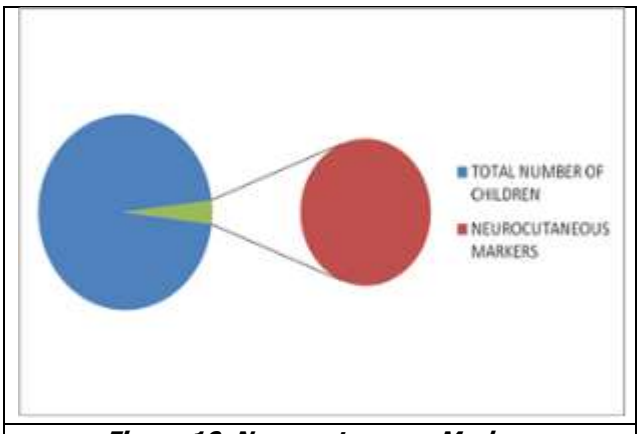

Figure 10. Neurocutaneous Markers

In this study, neuro cutaneous markers were seen in 2 cases. One was port wine stain of struge weber syndrome and other was café au lait spots of neurofibromatosis-1.

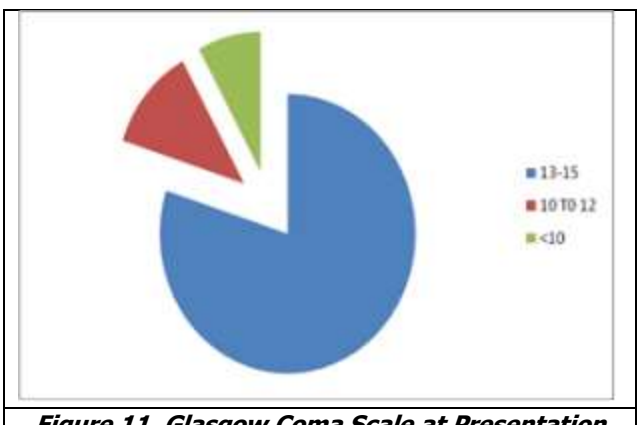

Figure 11. Glasgow Coma Scale at Presentation

Of the total 50 children, 40 (80%) chidren had normal GCS score and poor GCS score was seen in 20% of children in which <10 was seen in 4(8%) chidren and between 10-12 were 6 children (12%).

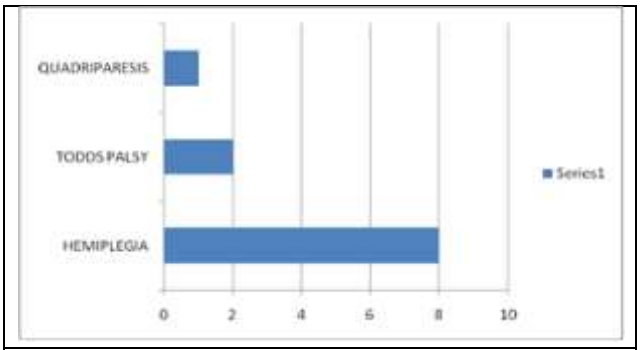

Figure 12. Neurological Deficit

In this study of 50 children, (22%) 11 children had neurological deficits. Hemiplegia was seen in 8(16%) children which was most common neurological deficit at the time of presentation. Quadripelgia was seen in 1 (2%) children and todd's palsy was seen in (4%) 2 children.

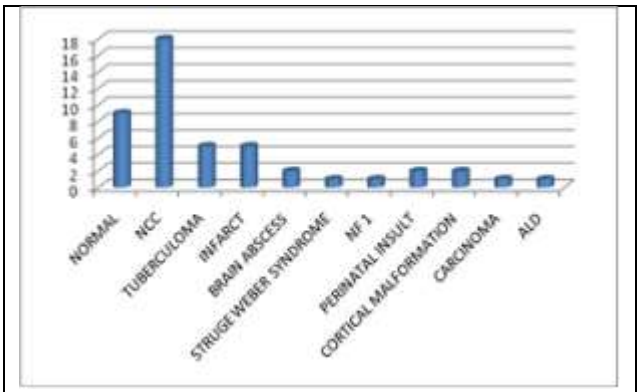

Figure 13. Neuroimaging

In the total 50 cases, imaging studies were carried out in all children. MRI was done in all the cases and CT was done in 4 cases. EEG was diagnostic in 4 cases for rolandic epilepsy.

The most common neuroimaging finding was Neurocysticercosis in 18 cases (36%), tuberculoma in 5 cases (10%), infarct in 5 cases (10%), brain abscess in 2 cases (4%), cortical malformation in 1 case (2%), perinatal insult in 2 cases (4%), neurocutaneous syndromes in 2 cases (4%) in which struge weber syndrome was the one and neuro fibromatosis-1 in other.

1 case of MRI has showed carcinoma and Adenoleukodystrophy a neuroregressive disorder was observed in one case and the MRI was normal in 8 cases.

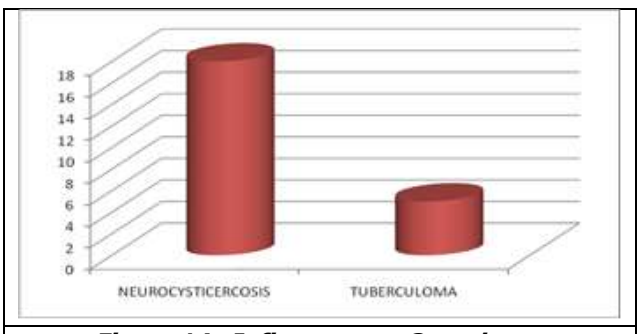

Figure 14. Inflammatory Granulomas

In MRI, inflammatory granulomas were seen in 23 cases of total 50 cases in which neurocysticercosis was seen in 18 cases (78.2%) and tuberculoma in 5 cases (21.7%).

Diet	Total Number of Cases (50)	Cases with NCC (18)
Veg	11(22%)	3 (16.6%)
Non-Veg	39(78%)	15 (83.3%)

Table 1. Dietary Pattern in Children with NCC

Dietary pattern in NCC analyzed revealed mixed pattern in 15 cases and vegetarian diet in pattern in 3 cases.

	Right	Left
Frontal	2	-
Parietal	2	6
Fronto-Parietal	3	3
Temporo-Parietal	-	1
Cerebellum	1	-

Table 2. MRI Findings in Neurocysticercosis

Parietal lobe was the most common lobe involved, constituting 7 cases (53.3%) followed by fronto-parietal region in 5 cases (40%). 7 (38.8%) cases were observed involving the right cerebral hemisphere and 10(55.5%) cases involving left cerebral hemisphere.

Lobes Involved	Right	Left
Frontal	1	_
Parietal	1	_
Cerebellum	3	_

Table 3. Lobes Involved in Tuberculoma

Cerebellum was the most common region involved in tuberculoma. Three (60%) cases involving cerebellum was observed and right side was most involving region in cerebrum.

Normal	34 (68%)
Abnormal	16 (32%)
• Focal Discharges	• 8 (16%)
• Generalized Discharges	• 4 (8%)
• Rolandic	• 4 (8%)

Table 4. EEG Findings

EEG was abnormal in 16 (32%) of cases. The most common abnormality noted on EEG was focal discharges. EEG was diagnostic of Rolandic epilepsy in 4 cases.

Diagnosis	No. of Cases
Inflammatory Granulomas	23 (46%)
• Neurocysticercosis	18 (36%)
• Tuberculoma	5 (10%)
Infections	6
• Meningitis	4
• Brain Abscess	2

Stroke	5 (10%)
Rolandic Epilepsy	4 (8%)
Perinatal Insult	2 (4%)
Neurocutaneous Syndrome • Sturge Weber Syndrome • Neurofibromatosis	2 (4%) 1 1
Carcinoma	1 (2%)
Adrenoleukodystrophy	1 (2%)
Cortical Malformation	1 (2%)

Table 5. Diagnosis of Focal Seizures

NCC was predominantly observed between 4-6 years of age group. The youngest age of NCC occurrence was 2.5 years. The commonest age group f of occurrence for tuberculoma was 6-10 years. Cortical malformations, stroke was observed in 4-6 years of age group.

DISCUSSION

Focal seizures were quite common in childhood in which majority of focal seizures will have some identifiable pathology when compared to generalized seizures.[8] The present study was done at King George hospital, Andhra Medical College, Department of paediatrics, a tertiary care centre. A total of fifty children with focal seizures of age group 1-10 years formed the study group. The mean age of occurrence was 4.5 years. Male to female ratio was 1.7:1. All children had motor symptoms. Sensory symptoms were observed in only 6% of children. Focal dyscognitive seizures were the commonest type of focal seizures. Right sided (62%) focal seizures was common than left focal (38%).[9] Past history of seizures was present in 9 (18%) children. Global developmental delay was observed in 3 (6%) children. Microcephaly was observed in 4 (8%) children. Neurological deficits were observed in (18%) 9 children and most common form noticed was hemiplegia (16%) 8 cases. The most common finding observed in Neuroimaging was inflammatory granulomas seen in 23 children in which NCC was noticed in 18 (62%) children and tuberculoma was noticed in 5 (7.2%) children followed by stroke in (5%) 10 children and epilepsy syndromes in 4 (8%) children.

CONCLUSIONS

- Focal seizures with loss of consciousness were the commonest type followed by secondary generalization in focal seizures and focal seizures without loss of consciousness.
- Inflammatory granulomas like NCC and tuberculoma were the most common causes of focal seizures.
- MRI is a valuable tool which differentiates NCC and tuberculoma.
- EEG is helpful in diagnosis of epilepsy syndromes mainly rolandic epilepsy.[9]
- Appropriate investigations were necessary in diagnosis of focal seizures for adequate treatment and prognosis.

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