

Original Research Article

Clinicoetiological profile of infantile onset seizure disorder at a tertiary care hospital

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ABSTRACT

Background: Current study was conducted with the objective to identify the type of seizures in infants and to know the underlying etiological factors and to know the presence of co-morbidities.

Methods: Hospital based retrospective study of 35 children conducted from January 2018 to January 2020. Files of children who were diagnosed with infantile onset seizures during that period were retrieved and analyzed.

Results: Out of the 35 children with seizures, generalized tonic clonic seizures was the commonest type of seizures 20 (57%), followed by simple partial and myoclonic seizures in 20% and 11.4% respectively. Structural causes were the commonest identifiable cause of seizures. Developmental delay was the most common co-morbidity followed by visual impairment.

Conclusions: Seizures in children less than 2 years is a potentially preventable entity, likely to be amenable to better perinatal care, early identification and management of seizures. Commonly associated co-morbidity with seizures was developmental delay that requires close followup and early intervention.

Keywords: Infantile onset seizure, EEG, Neuroimaging, Outcome

INTRODUCTION

A seizure represents the clinical expression of abnormal, excessive, synchronous discharges of neurons residing primarily in the cerebral cortex. This abnormal paroxysmal activity is intermittent and usually selflimited, lasting seconds to a few minutes. Epilepsy is the most common disabling neurological problem among children worldwide, and has a varying prevalence and etiological profile across the life-cycle.¹ Onset of epilepsy prior to two year age is more common than later in childhood.² It more commonly has a symptomatic cause and poor long-term outcome with respect to seizure-control and cognition.²⁻⁷ A recent community-based study in this age-group in UK identified the highest incidence among Asian children.³ In Indian set up

majority of cases have a structural etiology.⁵ Perinatal asphyxia still remains the single most common etiology for infantile epilepsy as it is for cerebral palsy, global developmental delay or intellectual disability.⁸

Neuroimaging and electroencephalography should be the first step in the evaluation of infants with epilepsy. Once imaging is normal or non-specific or a strong family history is available, further investigations should be planned keeping the following points into consideration without missing a treatable etiology. Identified epilepsy syndrome such as West syndrome will further govern the treatment choices. As the etiology and clinical spectrum is varied and the treatment depends on the type of seizure, this study is taken up in our hospital.

Objective

Objective of the current study was to identify the type of seizures in infants and to know the underlying etiological factors and to know the presence of co-morbidities.

METHODS

Current study was a hospital based retrospective study conducted from January 2018 to January 2020, after institutional ethics committee clearance in Yenepoya medical college. Files of children who were diagnosed with seizures during this period were retrieved and analyzed. Clinical features, etiology, associated co-morbidities and related laboratory (complete blood count, serum calcium, serum magnesium, EEG, MRI, ABG metabolic workup) findings were noted down in pre-structured proforma. Any other investigations based on the clinical presentation were also included.

Statistical analysis

Total sample size was taken as 35. The results of the study were entered in Microsoft excel and analyzed using SPSS software version 22.

Inclusion and exclusion criteria

Inclusion criterion for current study was all children with seizures till 2 years of age. There were no exclusion criteria.

RESULTS

In this study, 35 infants are analyzed who were aged between 1 month and 2 years, youngest being 31 days old and oldest being 2 years. The mean age of presentation was 6.5 months. Male preponderance was present where in males were 68% and females were 32%. Positive family history was present in 20%. On examination 12 had neurological abnormalities, 6 children had microcephaly, 1 had macrocephaly, 2 had neurocutaneous markers and 1 had squint.

Table 1: Types of seizures seen in infants.

Type of seizures	N (%)
Generalized tonic clonic seizures	20 (57)
Simple partial seizures	7 (20)
Myoclonic	4 (11.4)
Tonic	3 (8.5)
Epileptic spasms	1 (2.85)

Generalized tonic clonic seizures was the commonest type of seizures found in 20 (57%) of the children, followed by simple partial, myoclonic seizures, tonic and epileptic spasms in 20%,11.4%, 8.5% and 2.85% respectively. Out of 35, seven were on 2 antiepileptic medications, 2 were on 3 antiepileptics and remaining

were on one antiepileptic medications. One infant was on more than 5 antiepileptic medications and vitamins supplements.

Table 2: Etiology of infants with seizures.

Etiology	N
Structural causes (14.2%)	
Craniosynostosis	1
AV malformations	1
Ischaemic insult	1
Cerebral palsy	2
Metabolic causes (8.57%)	
Neurometabolic disease	1
Leighs disease	1
Lysosomal storage disorder	1
Infective causes (8.57%)	
Acute encephalitis syndrome	2
Japanese encephalitis	1
Others	
West syndrome	1
Febrile seizures	14
Neurocutaneous syndrome	1

Etiology was found in 56.7% out of which 5 (14.2%) had structural etiology and 5 had sequelae of perinatal asphyxia (14.2%), 3 had metabolic causes, 3 had infectious causes and cause was unknown in 3 (8.5%). Structural abnormalities include alteration in thickness, volume of brain grey matter and vascular abnormalities.

Identifiable cause of seizures was found in 15 (42.8%) children with seizures. Causes were depicted in the (Table 3).

Table 3: Developmental status (DQ).

Developmental delay	N (%)
No delay (DQ>85)	22 (62.8)
Mild delay (DQ, 50-70)	4 (11.4)
Moderate delay (DQ, 35-49)	1 (2.85)
Severe delay (DQ, 20-34)	1 (2.85)
Profound delay (DQ, <20)	4 (11.4)
Regression of attained mile stones	3 (8.57)

Neuroimaging had a high diagnostic yield, with an MRI abnormality seen in 42.9% of infants. EEG changes are seen in 31.4% in which 5 had generalized discharges and 1 had hypersarrhythmia. Out of 35 children with seizures developmental delay was the commonest (37%) comorbidity followed by visual impairment (20%). Hearing impairment was seen in 8.57% and feeding difficulty was seen in 2.85%. Degree of developmental delay is shown in (Table 4). Development delay was the commonest comorbidity (37%), with 11.4% having profound delay. In the present study children with developmental delay had significant neurological abnormality and abnormal neuroimaging (p=0.00).

Table 4: 3 factors associated with developmental delay in children (<2 years) with seizures.

Factors	Developmental delay present, (n=15)	Developmental delay absent, (n=20)	P value
Neurological abnormality			
Present	11	1	0.000
Absent	4	19	
Neuroimaging			
Present	12	3	0.00
Absent	3	16	
Electroencephalogram			
Present	7	4	0.19
Absent	8	16	

DISCUSSION

A retrospective analysis was carried out in 35 patients in a tertiary care hospital in Mangalore.

Out of the 35 infants who presented with seizures, the mean age of presentation was 6.5 months with male preponderance seen in 68%. This was similar to findings of study conducted by Adhikari et al at Nepal and Ernestina et al at China.^{9,10} Positive family history was seen in 20% of children with seizures.

Generalized seizures was the most common type of seizure observed in our study, which is similar to studies conducted by Idro et al and Saravanan.^{11,12} Febrile seizure was the commonest cause of generalized tonic clonic Seizure. Focal seizures were seen in 20% cases secondary to intracranial bleed and perinatal insult.

Structural causes was the most common etiology accounting for 14.2%, followed by metabolic causes in 8.5%, infectious sequelae in 8.5% and unknown etiology in 8.5%. Most common structural cause of seizures was secondary to hypoxic-ischemic insult/perinatal insult (14.2%), which was similar to a study carried out by Poudel et al who found that birth asphyxia (12%) was the most common cause of afebrile seizure.^{13,14}

Imaging study was done in 28 cases of which, 15 cases (42.8%) showed abnormalities. MRI was superior in terms of diagnostic yield in cases of structural deformities. This was similar to the imaging studies as per Hsieh et al.¹³

Developmental delay was seen in 37.2% of the cases. Clinical examination in such cases showed abnormal neurological examination in 34.2%, microcephaly in 16.1%, macrocephaly in (2.6%) and neurocutaneous markers in 3.7% patients. This was similar to previous studies conducted by Kumar et al.⁹

Based on this study perinatal insult secondary to structural causes was most common, which is a potentially preventable entity, likely to be amenable to

better perinatal care and early identification and management of seizures.

CONCLUSION

Etiological evaluation should be considered in children following first episode of seizures, especially in developing countries like India. High prevalence of comorbid developmental delay underscores the need for follow-up of all high-risk infants, and early identification and management of seizures.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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