

UTILITY OF INVESTIGATORY WORKUP IN SEIZURES OF CHILDREN AGE BETWEEN 1 MONTH TO 5 YEARS A HOSPITAL BASED PROSPECTIVE STUDY

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Abstract

Background: Seizure is the most common paediatric neurological disorder in children with 4 to 10% at least one attack of seizure in the first 16 year of life. It can be a cause of morbidity and disability in childhood if not treated. **Materials and Methods:** 100 children aged between 1 month to 5 year having seizures were studied. Blood examination included CBC, RBS, serum Na⁺, K⁺, calcium and CSF analysis was done EEG, CT/MRI scan was also carried out. **Result:** Out of 100 patients 24 had laboratory positive findings, 27 had abnormal EEG and 33 had abnormal CT/MRI findings. Total 84 had abnormal findings and 16 were idiopathic. **Conclusion:** Febrile seizures were the commonest aetiology of seizures in 7 months to 2 years. CNS infections were in 1 month to 6 months. Metabolic and vascular cause were more common in 1 month to 6 months. In 2 to 5 years of age CNS infections and Neurological causes were observed. This pragmatic study of different age groups will help the paediatrician to treat and diagnose such patients efficiently to avoid morbidity and disability in children because seizures are one of the social stigmas.

INTRODUCTION

Seizure is the most common paediatric neurological disorder, 4 to 10% of children suffering at least one attack of seizure in the first 16 year of life.^[1] The incidence is highest in the children less than 3 years of age, with a decreasing frequency in older children.^[2] Seizure is a non-specific symptom of an underlying brain disorder and frightening experience for parents or family members. Convulsion disorders represent one of the most common neurological problems in children. Most occur before age 5 years because the causes associated with seizures are fever, metabolic disturbances, head trauma, CNS infection and acute encephalopathy occur predominantly in early children.^[3] A serious concern to the child is the unpredictability of seizures, it may occur at any time, while playing or social setting etc.^[4] Introduction of EEG and CT scan has really helped to know the causes of epilepsy. Moreover CSF, serum electrolytes also played vital role to diagnose the causes of seizures. Apart from these investigations aetiology of seizures in majority of children is still ambiguous. Hence attempt was made

to evaluate the children at different age group with all available investigation like EEG, CT/MRI, CSF and blood. So that present study can be guideline to paediatrician to treat children having seizures efficiently.

MATERIALS AND METHODS

100 children aged 1 month to 5 year seizures patients admitted at paediatric department of government medical college hospital Ongole, Andhra Pradesh-523001 were studied.

Inclusive Criteria

Age group 1-month to 5 years diagnosed new onset seizures were selected for study.

Exclusion Criteria

Having history of neonatal seizures and above 5 years was excluded from study.

Method

Every admitted child having new onset of seizures was studied clinically Blood examination included CBC, RBS, serum Na⁺, K⁺+calcium to evaluate the

metabolic disorders. CSF analysis was done in the case of suspected meningitis, encephalitis and in febrile seizures < 1 year of age.

EEG was performed in all patients except in patients with typical febrile seizures, using 18- channel EEG machine (Model EE 18) from Recorder and Medicare system. CT scan of head on spiral CT (somatic emotion from SIEMENS) / cranial MRI (0.4 Tesla) was performed in all patients except in typical febrile seizures.

Duration of study was July-2021 to December-2021.

Statistical analysis

Various findings of blood examinations EEG, CT scan were classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

RESULTS

[Table 1] Types of seizures by age groups

- 1 month to 6 month – 11 had generalised, 4 had status epileptics total 14.
- 7 month to 2 years – 29 children had generalised, 4 had status epileptics total 32
- 2 years to 5 years – 3 children had focal 13 had generalised, 5 had status epileptics

[Table 2] Study of aetiology of seizure in children (total no. 67) – In Febrile -17 (25%) had typical, 6 (9%) Atypical

- Metabolic – 1 (1.5%) hypocalcaemia, 1 (1.5%) hypoglycaemia, 1 (1.5%) hyponatremia, 7 (11%) meningitis
- CNS infection – 2 (3%) encephalitis, 4 (6%) neuricysticercosis,
- Neurological / development – 5 (8%) cerebral palsy 2 (3%) neuro degenerative disorders, 1 (1.5%) Neurocutaneous syndrome, 2 (3%) hydrocephalus, 2 (3%) VP shunt malfunction, 1 (1.5%) congenital malformation, 2 (3%) primary epilepsy syndrome
- Vascular – 2 (3%) infarct, 2 (3%) venous thrombosis, 2 (3%) haemorrhage
- History of head injury – 4 (6%) 3 (5%) Idiopathic

[Table 3] Laboratory findings for diagnosis of aetiology of seizures – 1 Hypothyroidism (hypocalcaemia), 1 fasting hypoglycaemia (hypoglycaemia), 1 Bartter's syndrome (hyponatremia), 1 sickle cell anaemia (P S study), 2 – late HDN (PT, APTT abnormal), 4- Neuricysticercosis (Esinophilia) 9- Meningitis, Encephalitis (Abnormal) CSF analysis), 2- cerebral thrombosis (GE with severe dehydration) 2- Bartters syndrome, Fasting hypoglycaemia (Abnormal ABG), 1- Hypoparathyroidism (highparathormone).

[Table 4] Utility of EEG Abnormalities in diagnosing aetiology of seizures – 23 (46%) Normal, 9 (18%) Focal, 16 (32%) generalised, 1 (2%) Hypsarrythmia (west syndrome), 1 (2%) Lennoxgastaut syndrome

[Table 5] Incidence of Neuro imaging abnormalities in different etiological conditions-1 (3.3%) Atypical febrile seizures, 10 (30.3%) CNS infection, 13 (39.3%) neurological / developmental, 1 (3.03%) primary epilepsy syndrome, 6 (18.1%) had vascular, 4 (12.1%) had head injury, 1 (3.03%) Idiopathic

Table 1: Types of Seizures by Age Groups (No. of Patients: 67)

Type of Seizures	1M-6M n (%)	7M-2YR n (%)	2-5 YR n (%)
Focal	11 (16.4%)	29 (43.2%)	3 (4.4%)
Status epilepticus	3 (4.4%)	3 (4.4%)	5 (7.4%)
Total	14	32	21

The highest seizures was Focal in 1 month to 6 month 11 (16.4%) and 29 (43.2%) in 7 month to 2 years and least was observed in Status epilepticus 3 (4.4%) in 1 month to 2 year and 5 (7.4%) patients in 2 to 5 years.

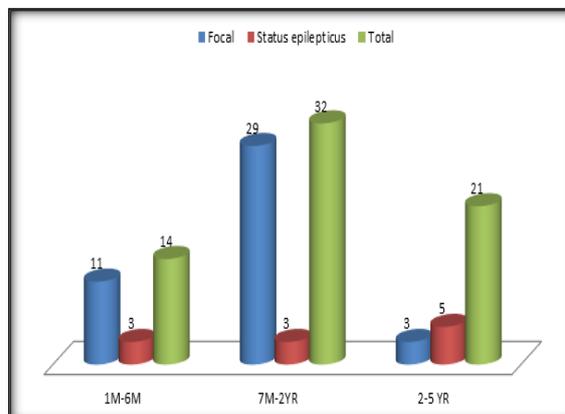


Figure 1: Types of Seizures by Age Groups

Table 2: Aetiology of Seizures in Children

Aetiology	No. of cases	Percentage (%)	
Febrile	Typical	17	25.3
	Atypical	6	8.9
Metabolic	Hypocalcaemia	1	1.49
	Hypoglycaemia	1	1.49
	Hyponatremia	1	1.49
CNS infections	Encephalitis	2	2.98
	Neuricysticercosis	4	5.97
Neurological / developmental	Syndromes	5	7.46
	Hydrocephalus	1	1.49
	VP shunt malfunction	2	2.98
	Congenital malformation	1	1.49
	Primary epilepsy syndrome	2	2.98
Vascular	Infarct	2	2.98
	Venous Thrombosis	2	2.98
	Haemorrhage	2	2.98
H/o Head injury	4	5.97	
Idiopathic	3	4.47	

Typical Febrile was highest 17 (25.3%), followed by CNS infections Syndromes was 5 (7.46%)

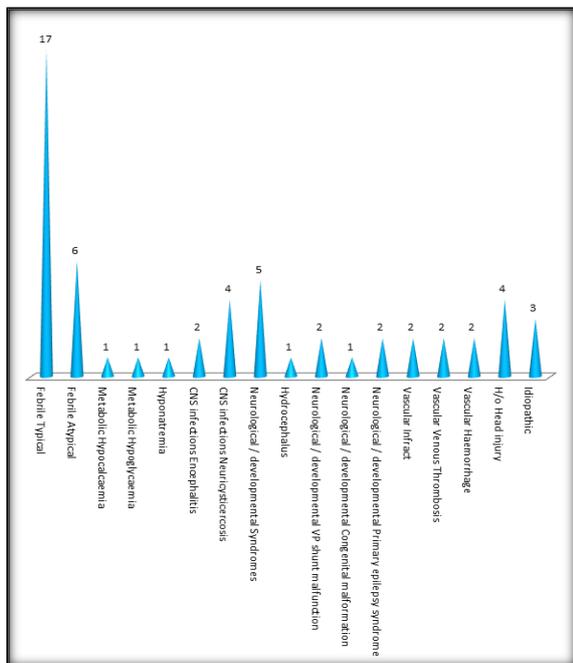


Figure 2: Aetiology of Seizures in Children

Table 3: Utility of Laboratory Tests Diagnosis of Aetiology of Seizures (Total No. of patients: 24)

Laboratory Test	Diagnosis	No. of cases
Hypocalcaemia	Hyperparathyroidism	1
Hypoglycaemia	Fasting hypoglycaemia	1
Hyponatremia	Barter's syndrome	1
Sickle cell in peripheral smear	Sickle cell anaemia	1
PT, APTT abnormal	Late HDN	2
Esinophilia	Neurcysticercosis	4
Abnormal CSF analysis	Meningitis, Encephalitis	9
GE with severe dehydration	Cerebral thrombosis	2
Abnormal ABG	Barter's syndrome, Fasting hypoglycaemia	2
High parathormone levels	Hypoparathyroidism	1

Abnormal CSF was observed in 9 cases (including Meningitis, Encephalitis)

Investigation	Normal	Abnormal	Total
Neuro-imaging	17	33	50
Laboratory	26	24	50

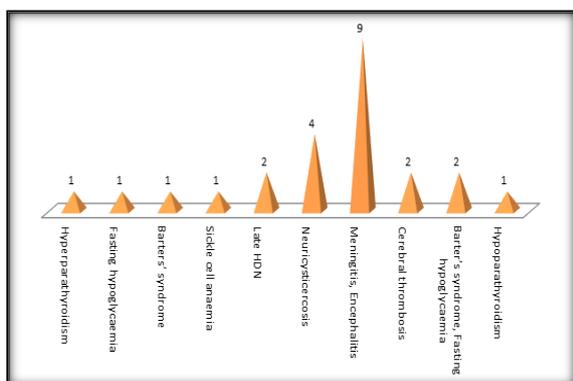


Figure 3: Utility of Laboratory Tests Diagnosis of Aetiology of Seizures

Table 4: Utility of EEG Abnormalities in Diagnosing Aetiology of seizures

Type of EEG Abnormalities	No. of Cases	Percentage
Normal	23	46
Focal	9	18
Generalised	16	32
Hypsarrythmia (west syndrome)	1	2
Generalized slow spike and wave discharges (Lennox gastaut syndrome)	1	2
Total	50	100

27 children had abnormal EEG and 23 (46%) were normal.

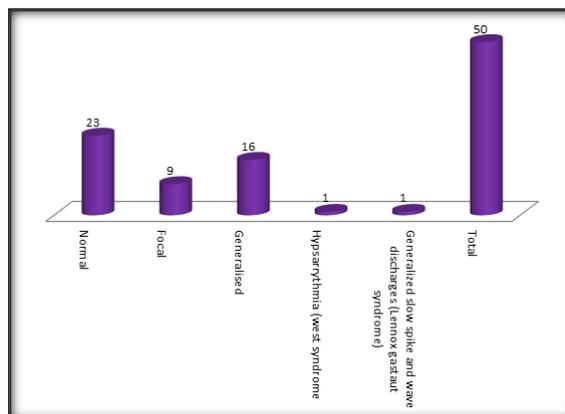


Figure 4: Utility of EEG Abnormalities in Diagnosing Aetiology of seizures

Table 5: Incidence of Neuro-imaging Abnormalities in Different Etiological Conditions

Aetiology	Abnormal Neuro-imaging n (%)
Atypical febrile seizures	1 (3.03%)
Metabolic	0 (0)
CNS infections	10 (30.3%)
Neurological / developmental	13 (39.3%)
Primary epilepsy syndrome	1 (3.03%)
Vascular	6 (18.1%)
Head injury	4 (12.1%)
Idiopathic	1 (3.03%)
Total	33

33 patients had abnormal finding and remaining had normal findings

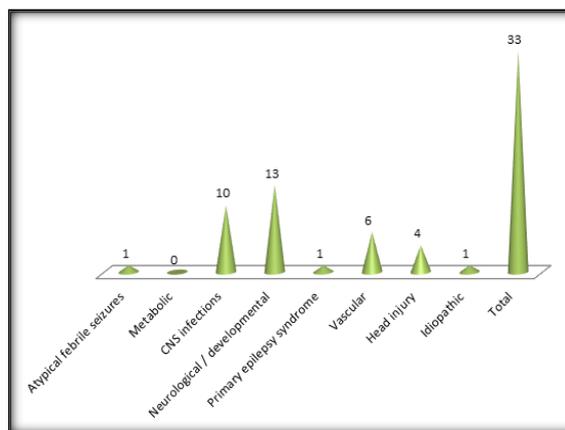


Figure 5: Incidence of Neuro-imaging Abnormalities in Different Etiological Conditions

DISCUSSION

The present study of seizures of children aged 1 month to 5 years in Andhra Pradesh population. In the age group 1 month to 6 month 11 (16.4%) generalised seizure, 3 (4.4%) status epilepticus total 14 patients. In age group 7 months to 2 year of age 29 (43.2%) generalised seizures, 3 (4.4%) status epilepticus, total 32 patients. In the age group 2nd year to 5th year of the age group 3 (4.4%) focal seizures, 13 (19.4%) generalised seizures, 5 (7.4%) [Table 1]. The Aetiology of seizures Febrile has 17 (25.3%) had typical, 6 (8.9%) atypical, In metabolic aetiology – 1 (1.49%) hypocalcaemia, 1 (1.49%) hypoglycaemia, 1 (1.49%) hyponatremia. In CNS infection 7 (10.4%) had meningitis, 2 (2.98%) encephalitis, 4 (5.97%) had neurocysticercosis Neurological / developmental, 5 (7.46%) cerebral palsy, 2 (2.98%) neurodegenerative disorders, 1 (1.49%) neuro coetaneous syndrome, 2 (2.98%) hydrocephalus, 2 (2.98%) VP shunt malfunction, 1 (1.49%) congenital epilepsy syndrome. In vascular aetiology – 2 (2.98%) infarct, 2 (2.98%) venous thrombosis, 2 (2.98%) haemorrhage, 4 (5.97%) head injury, 3 (5.97%) were Idiopathic [Table 2]. In laboratory diagnosis 24 patients had abnormal findings [Table 3]. In EEG study 27 had abnormal findings [Table 4]. In Neuro imaging study 33 had abnormal findings [Table 5] These findings are more or less in agreement with previous studies.^[5,6,7] It is reported that, non-febrile seizures was highest in 1st year of life especially in 1st month Non-febrile was symptomatic rather than idiopathic epilepsy. The prevalence epilepsy was found at the peak age of onset of 1st year and 90% of attack occurred during first three years of life and male children were predominantly affected by seizures.^[8,9]

It was also reported that metabolic seizures were more frequency (30%) febrile seizures (18.7%) Idiopathic epilepsy (7.8%) and least was CNS infections (2.5%) and most common abnormal neuro imaging was cerebral atrophy, white mater lesions, enlarged ventricles, focal hypo dense lesions, infarcts and haemorrhage cerebral palsy is the commonest neurological cause of seizures in children.^[10]

CONCLUSION

Present study of seizures in the different age group of children in Andhra Pradesh Population. Incidence of seizures is more common in 7 months to 2 years age group males have high incidence than females. Generalised seizures are the commonest type of seizures. Focal seizures are scan only in 2-5 years age group various biochemical, pathological, microbiological, EEG, neuro imaging were quite useful to diagnose the type of seizures but this study demands genetic, nutritional, embryological, pathophysiological, environmental studies because exact

pathogenesis and mechanism of seizures is still unclear.

Limitation of study

Owing to tertiary location of present hospital, small number of patents and lack of latest techniques we have limited findings.

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