Original Article

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Prevalence of Seizures in Children in Central India

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Abstract

Background: Seizure is one of the common causes of childhood hospitalization with significant mortality and morbidity. There is limited data regarding the prevalence of seizures in children from the developing countries. *Aim & Objectives:* To find the prevalence of epileptic and non-epileptic seizures and the common etiology of seizures in various age groups presenting to tertiary care center in Central India. *Material & Methods:* This was a hospital based observational study carried out in the Department of Pediatrics, Acharya Vinoba Bhave Rural Hospital, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha from 1st August 2012 to 31st July2014. All patients who were fulfilling the inclusion criteria within the age group of >28 days to 15 years were enrolled for the study. *Results:* A total of 169 patients were admitted for seizures with 115 (68%) males and 54 (32%) females. Among these patients, Maximum patients were in the age group between 1.1 year to 5 years of age(41%) . the prevalence of epileptic seizures was 6.5/1000 population whereas the prevalence of non-epileptic seizures was 4.1/1000 population. Most common type were epileptic seizures(61.5%) followed by febrile seizures(25.5%) and Acute symptomatic seizures(13%).Generalized tonic-clonic seizures were the most common type of seizure presentation (59.2%). *Conclusion:* To conclude, with respect to the age and sex of patients, the prevalence of epilepsy in our region is not so much different from that of patients in other parts of the country.

Introduction

Seizure is a common problem evaluated in paediatric emergency departments.[1] A seizure is defined as transient, involuntary alteration of consciousness, behaviour, motor activity, sensation, or autonomic function caused by an excessive rate and hypersynchrony of discharges from a group of cerebral neurons. A postictal period of decreased responsiveness usually follows most seizures, in which the duration of the postictal period is proportional to the duration of seizure activity.[2] Epilepsy is considered to be present when >2 unprovoked seizures occur in a time frame of > 24 hours.[3] Acute symptomatic seizures occur secondary to an acute problem affecting brain excitability such as electrolyte imbalance or meningitis. Remote symptomatic seizure is thought to be secondary to a distant brain injury such as an old stroke.[3] Febrile seizures are seizures that occur between the age of 6 and 60 months with a temperature of 38°C or higher, that are not the result of central nervous system infection or any metabolic imbalance, and that occur in the absence of a history of prior afebrile seizures.[3] The prevalence of epilepsy varies from 4 to 10 per 1000 population (the lower figures in developed countries, while the higher figures in developing countries)[4]. Majority of studies conducted in Asia, the age-adjusted prevalence of 10.2 per 1000 in Asian Turkey[5] was higher than both the age-adjusted prevalence of 6.6 per 1000 and 9.8 per 1000 in the

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studies conducted in Turkey and Pakistan by Aziz et al[6] . This prevalence was much higher than the age-adjusted prevalence reported in studies conducted in India and China, where prevalence ranged between 2.2 and 4.4 per 1000.[7 8 9]

The incidence rates of febrile seizures in India are comparable to those in the developed world. The Yelandur survey[10] conducted in rural South India estimated the prevalence to be 3.28-5.71 / 1000 whilst the more recent Uttarakhand survey[11] found a prevalence of 2.27 per 1000 population. **This study was done to** find out the prevalence of epileptic and non-epileptic seizures in Central India and to determine the different etiological types of seizures.

Materials and Methods

The study was conducted at Department of Pediatrics, Acharya Vinoba Bhave Rural Hospital, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha. It was an observational descriptive study which was conducted for a period of two years from 1st August 2012 to 31st July2014. The study was initiated only after obtaining permission from the Institutional Ethics Committee. All patients who were fulfilling the inclusion criteria i.e., Children with an episode of seizure or history of seizure irrespective of the etiology within the age group of >28 days to 15 years admitted in Pediatrics ward / ICU of Acharya Vinoba Bhave Rural Hospital,Sawangi,Wardha. were enrolled for the study. The sample size was calculated by considering of prevalence of seizures as 6 / 1000 population[12] with 95% Confidence Interval and precision of 3%.The minimum value calculated was 136.

In total, we recruited 169 subjects. Detailed history including past history of any seizures and history of prior treament were noted. After noting the history, general and systemic examination was carried out and noted in the proforma.

Seizures were divided into two groups:

1. Epileptic seizures
2. Non-epileptic seizures

Epilepsy is considered to be present when >2 unprovoked seizures occur in a time frame of > 24 hours.[3]

In epileptic seizures, we divided into following two categories:

a. *Idiopathic:* The cause of seizures not known.

b. *Secondary:* which were secondary to other diseases like cerebral palsy, neurodegenerative disorders, syndromic children, congenital malformations, and neurocutaneous syndromes, remote symptomatic seizures due to space occupying lesions, neurocysticercosis, and old stroke.

In Non-epileptic seizures we included:

a. Febrile seizures

b. Acute Symptomatic seizures like meningitis, encephalitis, acute vascular insult, metabolic problems. We included acute symptomatic seizures in non-epileptic group as they primarily need treatment of the underlying condition and anti seizure drugs are required for a shorter duration of time[13]

After a complete clinical examination , cases had undergone investigations like complete haemogram, ESR, Serum Calcium, Blood Sugar, Blood Urea, Serum Creatinine, Liver function tests, Lumbar puncture, Serum electrolytes, Chest radiograph PA view wherever indicated.

Relevant investigations like computed tomography (CT) scan, Magnetic Resonance Imaging(MR) and EEG were advised when necessary.

Antiepileptic treatment was started according to the Guidelines for Management of Pediatric Epilepsy by IAP[14]. In case of febrile seizures, intermittent clobazam therapy was advised. The data was arranged in Microsoft excel sheet and various percentages were calculated and statistical analysis was performed using the statistics software SPSS for windows (17.0 SPSS, Chicago). Appropriate tests of significance were applied.

Results

Maximum patients were in the age group between 1.1 year to 5 years of age(41%) with mean age being 3.1 years followed by the age group between 5.1 year to 10 years of age(23%) with mean age 7.8 years. Out of total 169 patients, 68% were males and 32% were females with a ratio of M: F =2.1:1. We found that the prevalence of epileptic seizures was 6.5 / 1000 population whereas the prevalence of non-epileptic seizures was 4.1 / 1000 population. Most common type were epileptic seizures (61.5%) followed by febrile seizures (25.5%). Acute symptomatic seizures were found to be 13% in the study. Secondary epilepsy (53%) was frequently observed than idiopathic epilepsy (47%). In febrile seizures, simple type(60.5%)

was more common than complex (39.5%).Most frequently presented seizure was GTCS type (59.2%).Partial seizures were found to be 18.8% in our study. Table 1 shows the demographic data of children presenting seizure. Sodium valproate was the most frequently prescribed drug in GTCS(44.2%) ,Tonic(50%), myoclonic(83.3%), absence(100%), partial seizures with secondary generalisation(100%) and unclassified type(75%).Carbamazepine was used more often in clonic type(75%), simple partial(52.6%).

Table 1: Demographic data of children presenting with seizure

Age Group(yrs)	No of children	Percentage (%)
>28 days -1 yrs	28	16.57
1.1 – 5 yrs	69	40.83
5.1 – 10 yrs	39	23.08
>10 yrs	33	19.52
Total	169	100.00
Gender		
Male	115	68.05
Female	54	31.95
Total	169	100.00
Etiology of Seizure		
Epileptic	104	61.5
Febrile	43	25.5
Acute symptomatic	22	13.0
Total	169	100
Seizure Presentation		
GTCS	100	59.2
Tonic	19	11.2
Clonic	4	2.4
Atonic	2	1.2
Myoclonic	6	3.6
Absence	1	0.6
Simple partial	19	11.2
Complex partial	13	7.6
Partial Seizure with secondary generalization	1	0.6
Unclassified	4	2.4
Total	169	100.0

Discussion

Seizures are the most common paediatric neurologic disorders, occurring in almost 10% of children.[3] Childhood seizure is one of the most important causes of attending medical centres, especially emergency departments, and can be a cause of morbidity and disability in childhood. Age plays an important role in the etiology of seizures. 4 -10% of children suffer atleast one seizure in 1st 16 years of life.[2] In the present study, maximum number of patients were in the age group between 1.1 year to 5 years of age(41%) with average age being 3.1 years. Various other studies have also found that seizures were maximum in the age group 1.1 to 5 years. Baheti et al[15] in Rajasthan also reported the maximum number of patients (41%) were in age group between

1.1 year to 5 years of age with average age 3.5 years which is similar to our study. A study conducted by Ashraf M et al[16] in Kashmir also reported the maximum number of patients (48%) in this age group which is comparable to our study. The percentage of male children was comparable to the study by Ashraf M et al[16] which was conducted in Kashmir, where percentage was 63%.

A study done in Karnataka by Joseph et al[17] reported the similar percentage (65%) of male patients in pediatric age group.One of the reasons for the above observation could be due to febrile seizures which are more common in males.[18] The Yelandur survey also found that there was a male preponderance (72%) in cases with active epilepsy.[12] Selena H Banu et al[19] also reported the similar findings where 65% patients were male with a male: female ratio of 1.85 which is in concordance with our study. The total prevalence of seizures was calculated to be 10.6 per 1000 population. The prevalence of epileptic seizures was found to be 6.5 / 1000 population whereas the prevalence of non epileptic seizures was 4.1 / 1000 population.

The World Health Organization (WHO) regards epilepsy prevalence as an indicator of countries Development.[20] A recent meta-analysis of published and unpublished studies puts the overall prevalence rate of epilepsy in India at 5.59 per 1,000 population, with no statistically different rates between men and women or urban and rural residence which is in concordance with our study.[12] Sridharan and Murthy reported overall prevalence of 5.3 / 1000 population; in urban population it was 5.1 / 1000 whereas in rural it was reported to be 5.5 / 1000 population.[21]This rate is surprisingly similar to that in developed nations. The CRESS study in Andhra Pradesh showed a prevalence rate of 6.2 per 1000 population[12].The prevalence in Kerala, a more developed state with high awareness of health related issues, is 4.3 per 1000 population.[7] A recent rural epilepsy surveillance program from Uttarakhand showed a prevalence rate of two or more unprovoked seizures to be 7.5 per 1000.[11] A Pediatric study from Kashmir valley shows prevalence rates of 3.74 / 1000 in males and 3.13 / 1000 in females.[22] A study conducted in Kolkata's urban population showed an annual incidence rate of 27.27 per 100,000 per year.[23] The prevalence of epilepsy in the Kolkata study is similar to that obtained in earlier Indian studies.[24] In the present study, the prevalence of non-epileptic seizures i.e., febrile seizures and acute symptomatic seizures was 4.1 / 1000 population. Earlier Indian studies[12] suggested the prevalence of febrile seizures as 3% of all hospital admissions but the Yelandur survey[10] estimated the prevalence to be 3.28-5.71 / 1000 which is comparable to our study whilst the more recent Uttarakhand survey[11] found a prevalence of 2.27 per 1000 population.

There is limited number of studies on epidemiology of acute symptomatic seizures. Saravanan[25] conducted a study in South India and reported 20% of the patients with acute symptomatic seizures. This finding is similar to our study where we got a prevalence of acute symptomatic seizures as 13%. A population based study done in Taiwan[26] reported the incidence of acute symptomatic seizures to be 0.46 per 100 population comparable to our findings. Worldwide, febrile seizures are the most common type of acute seizures in children.[27] In a recent study conducted by Saravanan[25] in Tamil Nadu, they reported the epileptic seizures as 33%, febrile seizures 37% and symptomatic seizures 20%. Adhikari et al[28] in their study of 551 children from Western Nepal also observed seizure disorder as 33.6%, febrile seizures 30.5% and symptomatic in 25% patients. These findings were not comparable to our study. The disparity in findings could be due to the fact that patients of febrile seizures are generally taken care of by private practitioners and our centre being a tertiary care, we get more cases of epilepsy mostly referred from peripheries.

In our study, GTCS was the most common type of seizure (59.2%), irrespective of the underlying etiology (epileptic or non epileptic) followed by simple partial (11.2%) and complex partial seizures (7.6%). In the literature available it is noted that generalized tonic clonic, (GTCS) seizures are the most common type of childhood seizures, occurring in almost 61% of cases[29]

which is in concordance with our study. Poudel P et al[30] also reported GTCS as the most common type 58.4% followed by simple partial 5% and complex partial 7.8% which is comparable to our study. Mistry et al[31] reported that sodium valproate was the frequently presecribed drug for generalised seizures and unclassified seizures whereas carbamazepine was used more frequently in partial seizures. These findings were comparable to our observations.

Conclusion

In this study we find a higher frequency of epilepsy than febrile seizures and acute symptomatic seizures. The prevalence of epilepsy in our region is not so much different from that of patients in other parts of the country.

Limitations

It was a hospital based study so the actual prevalence of seizures in children might be higher than our findings. Details of other causes contributing for seizures like inborn error of metabolism, associated development delay like genetic causes could not be specified due lack of investigations.

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