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Incidence and etiology of Epilepsy and Unprovoked seizures in children in the age group of 1 month to 6 years in Kashmir India

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Abstract: ***Background:*** *Seizure is one of the common causes of childhood hospitalization with significant morbidity and mortality. Objective of current study was to know the incidence and etiology of epilepsy and unprovoked seizures in children in the age group 1 month to 6 years in Kashmir India.*
Methods: *A prospective hospital based study conducted from 1 July 2009 to 30 June 2010. .Setting: Post graduate department of Pediatrics,GMC Srinagar. Participants: All the hospitalized sick children who had seizure in the age group 1 month to 6 years.*
Results: *The most common seizure type was Primary Generalized Tonic Clonic Seizures (77.1%) followed by Myoclonic (5.38%) and Complex partial seizures (4.48%). Incidence in males (55.1%) was higher than in females. The most common etiology for epilepsy was Idiopathic (79%) followed by Post HIE and or cerebral palsy seizures (18.3%).*
Conclusion: *The most common etiology for epilepsy was idiopathic 79%, followed by post Hypoxemic ischaemic (HIE) seizures. These post HIE Seizures can be prevented by improving the health care facilities, strengthening peripheral health care system and neonatal care units at district hospitals.*
Keywords: incidence, Seizures, Epilepsy, Etiology

I. Introduction

A seizure or a convulsion is a sudden, paroxysmal, involuntary, time-limited alteration in behavior, motor activity, autonomic function, consciousness, or sensation that results from abnormal electrical activity in brain [(8,13)].Seizures are the manifestation of abnormal hypersynchronous discharges of cortical neurons[(8,7)]. Seizures are common in the pediatric age group and occur in approximately 10% of children [(8, 13)].

Two unprovoked seizures > 24 hrs apart suggest presence of epileptic disorder within the brain that will lead to future recurrence [(13)]. Unprovoked seizures occur in absence of identified acute precipitant [(3, 4, 5)]. In studies in United States and Iceland, approximately 25% newly diagnosed unprovoked seizures in children occur as single event and will never meet criteria for epilepsy [(4, 5,6)]. Half of newly identified unprovoked seizures in childhood in Japan and Spain occur as single event without recurrence [(16)]. Although occurrence of seizure in child without provocative stimulus such as high fever is often considered to be harbinger of chronic seizure disorder or epilepsy, less than half of these children go on to develop second seizure[(2)]. As proposed by the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE) in 2005, epilepsy is defined as a brain disorder characterized by an enduring predisposition to generate epileptic seizures and by the neurobiologic, cognitive, psychological, and social consequences of this condition [(3, 4, 5)]. The lifetime likelihood of experiencing at least 1 epileptic seizure is about 9%, and the lifetime likelihood of receiving a diagnosis of epilepsy is almost 3%. However, the prevalence of active epilepsy is only about 0.8 %[(3, 4, 5, 10, 11, 12)].

In 1981, the International League Against Epilepsy (ILAE) developed an international classification of epileptic seizures that divides seizures into 2 major classes: partial-onset seizures and generalized-onset seizures [(3, 4)]. Partial-onset seizures begin in a focal area of the cerebral cortex, whereas generalized-onset seizures have an onset recorded simultaneously in both cerebral hemispheres [(3, 4, 10)]. Some seizures are difficult to fit into a single class, and they are considered unclassified seizures. This classification is still widely accepted [(3, 4, 12)].
Secondarily generalized seizures often begin with an aura that evolves into a complex partial seizure and then into a generalized tonic-clonic seizure [(3, 4, 11, 12)]. However, a complex partial seizure may evolve into a generalized tonic-clonic seizure, or an aura may evolve into a generalized tonic-clonic seizure without an obvious complex partial seizure [(3, 4, 11, 12)].

Tonic-clonic seizures are commonly referred to as grand mal seizures [(3, 4)]. They consist of several motor behaviors; including generalized tonic extension of the extremities lasting for few seconds followed by clonic rhythmic movements and prolonged postictal confusion [(3, 4)]. On clinical evaluation, the only behavioral difference between these seizures and secondarily generalized tonic-clonic seizures is that these seizures lack an

aura [3, 4, 11]. However, the aura preceding the secondarily generalized seizure is often forgotten because of postictal amnesia [3, 4, 11, 12]. The ictal correlate of generalized tonic-clonic seizures consists of generalized (bilateral) complexes of spikes or polyspike and slow waves [3,4,12]. These epileptiform discharges often have increased amplitude in the frontal regions [3, 4].

II. Material and Methods

This study was conducted in the postgraduate department of pediatrics, G.B Pant hospital, an associated hospital of the Government Medical College Srinagar North India. The hospital is referral tertiary care hospital housing department of pediatrics. It was hospital based prospective non-randomized study conducted from 1 July 2009 to 30 June 2010. Participants were all children with history of seizure in the age group 1 month to 6 year of the age.

Excluded from the study were all with Febrile Convulsions and Acute Symptomatic Seizures.

Following were the investigations done in children with unprovoked seizure:

Blood was obtained for complete blood counts, ESR, CRP, blood glucose, kidney function tests, serum sodium, serum potassium, serum calcium, serum phosphorous, and serum magnesium. MRI/CT scan and EEG was done in all patients with unprovoked seizures.

All children 1 month to 6 years of age with convulsions were evaluated by detailed history, relevant prenatal and postnatal events. Detailed clinical examination including signs for neuro-cutaneous syndromes, storage disorders, and chromosomal anomalies were looked for and the findings recorded on predesigned proforma.

The following were the standard case definitions to identify the etiology of seizures:

1. Epilepsy was defined as two unprovoked seizures >24 hrs apart.
2. Febrile seizures were defined as seizures during fever between 6 months to 6 years age in absence of intracranial infection or previous history of unprovoked seizures.
3. Acute symptomatic seizures were defined as seizures due to acute brain insult be it traumatic, infectious, toxic, metabolic, vascular, or due to other systemic disturbance.

The data collected was analyzed and scrutinized by SPSS (Stastical package for social science) and Minitab 11.30. Chi square test and students test were applied to draw the inferences.

III. Results

A total of 12012 children in the age group of 1 month to 6 year were admitted to GB Pant children hospital during 1-year study period. Among them 897 (7.4%) had recent seizure. Febrile seizures were diagnosed in 545 (60.6%), Acute Symptomatic Seizures in 129 (14.3%) and Seizure disorder in 223 (24.8%) of 897 patients. Only these 223 patients were included in the study, of which 123(55.1%) were males and 100 (44.9%) were females. Out of 223 patients 172 (77.1%) had Primary Generalized Seizures, , 12 (5.38%) Myoclonic seizures, 2 (0.89%) Absence Seizures, 8 (3.58%)) Tonic Seizures, 10 (4.48%) Complex Partial Seizures, 7 (3.1%) Simple Partial Seizures, 3 (1.34%) Secondary Generalized Tonic Clonic Seizures.

Table 1: Incidence of different types of seizures with gender distribution

Type of Seizure	Total Number	Males	Females
Unprovoked or seizure disorder	223(24.8%)	123	100
Febrile Seizures	545(60.6%)	308	237
Acute Symptomatic Seizures	129(14.3%)	62	67
Total	897		

The unprovoked seizures were more common in Males 123 (55.1%) than females 100 (44.9%).

Table 2: Following were types of Epilepsies diagnosed in children.

Epilepsy type	Total	Male	Female	%
Primary Generalized Tonic clonic seizures	172	94	78	77.1
Absence seizures	2	1	1	0.89
Myoclonic Seizures	12	8	4	5.38
Tonic seizures	8	5	3	3.58
Clonic seizures	6	3	3	2.69
Atonic seizures	3	1	2	1.34
Complex Partial Seizures	10	6	4	4.48
Simple partial seizures	7	3	4	3.1
Secondary GTCS	3	2	1	1.34

Table 3: Etiology of different types of epilepsies in children in 1 month to 6 years age group

Etiology	Total	Males	Females	% n=223
Idiopathic	178	98	80	79.8
Post HIE/Cerebral Palsy	41	22	19	18.3
Anatomical Malformations of brain	1	1	0	0.5
Sturge Weber syndrome	2	1	1	0.89
Tuberous Sclerosis	1	1	0	0.5
TOTAL	223	123	100	

The most common etiology for unprovoked seizures was idiopathic 178 (79.8%) followed by cerebral palsy 41(18.3). The other causes found were Sturge Weber Syndrome 2 (0.89%), Tuberous Sclerosis 1 (0.5%), and Anatomical Malformations of brain 1 (0.5%).

IV. Discussion

Incidence studies are not available from the Indian subcontinent. There are several prevalence studies which suggest prevalence rate epilepsy is 5.59/1000 population). Our study revealed the cumulative incidence of epilepsy 18.5/1000 (1.85%) which is in accordance with studies done by S.W Rose et al[16]. and R. Sridharan[17] who reported that cumulative incidence of epilepsy is 2-4%. While as studies conducted by Hauser WA[9] showed the incidence of epilepsy (recurrent unprovoked seizures) in children ranging from 0.05 to 0.1% (50 to 100/100000) contradicting our study.

The incidence of epilepsy ranges from 40 to 70 per 100,000 in most developed countries and from 100 to 190 per 100,000 (1-19%) in developing countries according to Sridharan[17].

The higher incidence of epilepsies in our study can be perhaps due to high incidence of birth asphyxia, increased rate of preterm deliveries, neonatal septicemia, TORCH infections, and low rate of immunization, poor socio economic status, and high rate of consanguious marriages. One of the main reasons for the higher incidence of epilepsy in Kashmir is the higher risk of experiencing conditions which can lead to permanent brain damage. There is still poor health care system in peripheries which cater more than 80% population, lack of pediatric specialists, poor referral system for newborn, high incidence of meningitis as vaccination against streptococcus pneumonia and H influenza is not routinely done, pre and perinatal complications and malnutrition and hereditary factors. Many of these factors are, however, preventable or modifiable, and the introduction of appropriate measures to achieve this could lead to a substantial decrease in the incidence of epilepsy in developing countries and Kashmir.

Our study showed that epilepsy is more common in males than females 55.1% vs. 44.9%, but difference is not statically significant, which is in consistent to R. Sridharan[17.]

Our study revealed that the most common cause of epilepsy was idiopathic 79.8% and specific cause was ascertained in 20.2% of cases. This is consistent with studies done by R. Sridharan[17], AL Rajesh et.al[1], they revealed that in more than 60% cases cause cannot be delineated. In our study primary generalized tonic seizures were the most common type 77.1%, which was in accordance with Hauser WA[9], Milen Pavlovik et al[14] and AL Rajesh et al[1.]

V. Conclusion

The incidence of unprovoked or epileptic disorders in the age group of 1 month to 6 years is 1.85%. The unprovoked seizures were more common in males 55.1% than females 44.8%. The most common presentation of unprovoked seizures was primary generalized tonic clonic seizures 77.1% and most common etiology for unprovoked seizures was idiopathic 79.8% followed by post HIE/cerebral palsy 18.3%. Hence incidence of unprovoked seizures can be decreased by strengthening comprehensive perinatal and neonatal care services.

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