



CLINICAL AND EEG PATTERNS IN SUBJECTS WITH IDIOPATHIC GENERALIZED EPILEPSY: A CROSS SECTIONAL RESEARCH FROM CENTRAL INDIA

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ABSTRACT

Backdrop: Idiopathic generalized epilepsies (IGE) are a category of illnesses characterised by a generalized, bilateral, synchronous, and symmetrical spike wave complex on EEG. They account for one-third of all epilepsies. In the inter-ictal phase, subjects with IGE have normal neurological status and no abnormalities on brain imaging. Normal backdrop and generalized discharges such as spikes, polys-pikes, poly-spike/spike, and waves can be seen in the inter-ictal EEG.

Aims and Objectives: To research clinical and EEG patterns in subjects with Idiopathic Generalized Epilepsy.

Methodology: During a one-year period, individuals with idiopathic generalized epilepsy at a tertiary health care center's Department of Neurology were studied for seizure types, EEG patterns, and syndromic epilepsy diagnosis in cross-sectional retrospective research. EEG was recorded for at least 30 minutes when sleeping and awake. Those who had a normal EEG the first time were subjected to 60 minutes of sleep and awake EEG. The information was given in a tabular format with percentages.

Results: The research included 130 subjects with IGE who were over the age of five. Subjects aged 16-30 years (44.62 percent) were the most impacted, followed by 31-45 years (23.07 percent), 6-15 years (18.46 percent), and 46-60 years (13.84 percent). Females (61.54 percent) were more affected than males (38.46 percent). GTCS alone accounted for 23.08 percent, Absences alone for 20.00 percent, GTCS + myoclonic jerks for 13.85 percent, GTCS + absences for 12.31 percent, Myoclonic jerks for 7.69 percent, Absences and myoclonus for 6.15 percent, GTCS + absences + myoclonic jerks for 6.15 percent, Atonic drop for 4.62 percent, Atonic drop and myoclonic jerks for Even after multiple EEG investigations, the EEG pattern was abnormal in 81.54 percent of the cases and normal in 18.46 percent. Focal discharges were detected in 32.30 percent of subjects, with the frontocentral area being the most common location. In 71.42 percent of instances, the focal discharges were unilateral, while in the remaining 28.57 percent, they were synchronous bilateral. 15.4 percent of individuals had occipital rhythmic intermittent delta activity (ORIDA). In all 14 JME subjects, photic stimulation increased discharges, whereas hyperventilation caused discharges in 92.3 percent of children with absence epilepsy. Abortive generalized bursts of discharges (less than 2 seconds) made up 53.08 percent of the aberrant generalized EEG pattern, whereas bursts longer than 2 seconds made up the remaining 46.92 percent. JME was the only source of poly-spike, spike wave discharges.

Conclusions: Our research revealed that the majority of the subjects were between the ages of 15 and 30, and that the majority of them were females. GTCs alone were the most common seizure type, followed by absences alone, and GTC + myoclonic jerks. With IGE, you can see focal discharges, typically from the frontocentral area. ORIDA is also seen in generalised epilepsy, especially CAE. JME is the only way to see polyspike discharges.

Key Words: EEG (Electro Encephalography), GTCS (Generalized Tonic Clonic Seizure), Myoclonic jerks, Absence.

INTRODUCTION:

Idiopathic generalised epilepsies, which account for one-third of all epilepsies, are characterised by a generalised, bilateral, synchronous, symmetrical spike wave complex on EEG.¹ In the interictal period, subjects with IGE have normal neurological

status and no abnormalities on brain imaging. Normal backdrop and generalised discharges such as spikes, polys-pikes, poly-spike/spike, and waves can be seen in the inter-ictal EEG. In comparison to the industrialised world, the aetiology of seizures differs in India and other developing countries^{2,3}. In

India, tuberculoma and neurocysticercosis are relatively common. In India, tuberculoma (65.9%), infections (15%), and neurocysticercosis (3.4%) are the leading causes of partial seizures, according to Washimkar et al. Similar anomalies have been seen in studies of people with localising seizures⁴. In a research of 591 subjects with generalised seizures, Murthy et al. discovered that 53% of them had an identified aetiological cause. IGE can have both focal and widespread discharges, which adds to the confusion⁵. As a result, it's critical to understand the clinical and EEG characteristics of IGE, as treatment and prognosis differ. Although focal seizures caused by Tuberculoma, Neurocysticercosis, and scar are widespread in poor nations like India, idiopathic generalised epilepsy still accounts for a significant portion of seizure morbidity. IGE can have both focal and widespread discharges, which adds to the confusion⁶.

MATERIAL AND METHODS

IGEs recognized by the International League Against Epilepsy (ILAE) are: Epilepsy with GTCS only, Childhood absence epilepsy, Juvenile myoclonic epilepsy, Epilepsy with myoclonic absences,

Juvenile absence epilepsy, Epilepsy with myoclonic-astatic seizures, IGE with phantom absences, Myoclonic epilepsy in infancy, Perioral myoclonia with absences. This was a cross-sectional research in the subjects with Idiopathic Generalized epilepsy at the Department of Neurology at tertiary health care center during one year period. All demographic information, such as age, sex, and epilepsy syndromic types, such as GTCS, Absences alone, GTCS + absences, GTCS + myoclonic jerks, Myoclonic jerks, Absences and myoclonus, GTCS + absences + myoclonic jerks, Atonic drop, Atonic drop and myoclonic jerks, Atonic drop and absence, Atonic drop and absence The pattern of the EEG was also noticed. The information was given in a tabular format with percentages. Interictal EEG was performed on the Galileo Machine utilising the usual 10-20 electrode placement technique. EEG was recorded for at least 30 minutes when sleeping and awake. Those who had a normal EEG the first time were subjected to 60 minutes of sleep and awake EEG.

RESULT

Table 1: Distribution of the subjects as per the age

Age	No.	Percentage (%)
6-15	24	18.46
16-30	58	44.62
31-45	30	23.07
46-60	18	13.84
Total	130	100.00

The majority of the subjects were in the age group of 16- 30 years (44.62%), followed by 31-45years (23.07%); 6- 15 years (18.46%); 46-60 years (13.84%);

Table 2: Distribution of the subjects as per age at onset of seizures

Age at onset	Epileptic syndrome	Frequency
6-15years	Childhood absence epilepsy, Jeavons syndrome, Doose syndrome	18.46%
16-30 years	Juvenile absence epilepsy, Juvenile myoclonic epilepsy, Jaevons syndrome, IGE with GTCs only	44.62%
>30 years	Juvenile myoclonic epilepsy, IGE with phantom absences and IGE with GTCs only	36.91%

Table 3: Distribution of the subjects as per the sex

Sex	No.	Percentage (%)
Male	50	38.46
Female	80	61.54
Total	130	100.00

The majority of the subjects were Female i.e. 61.54% followed by Male 38.46 %.

Table 4: Distribution of the subjects as per the various EEG pattern

	No.	Percentage (%)
Normal EEG	24	18.46
Abnormal	103	81.54
Focal discharges	42	32.30
Unilateral focal discharges	30	71.42
Bilateral focal discharges	12	28.57
ORIDA	20	15.4
Polyspike spike wave pattern	28	21.53
Generalized spike/sharp wave discharges	52	40
Generalised sharp wave discharges alone	26	20

In 18.46 percent of cases, the EEG pattern was normal, but in 81.54 percent of cases, it was abnormal. Focal discharges were found in 32.30 percent of subjects, with the fronto-central region being the most common. In 71.42 percent of instances, the focal discharges were unilateral, while in the remaining 28.57 percent, they were synchronous bilateral. 15.4 percent of individuals had occipital rhythmic intermittent delta activity (ORIDA). JME was the only source of poly-spike, spike wave discharges. GTCS was the most common type of seizure pattern, accounting for 23.08 percent, Absences alone accounting for 20.00

percent, GTCS + absences accounting for 13.85 percent, GTCS + myoclonic jerks accounting for 12.31 percent, Myoclonic jerks accounting for 7.69 percent, Absences and myoclonus accounting for 6.15 percent, GTCS + absences + myoclonic jerks accounting for 6.15 percent, Atonic drop accounting for 4. Subjects with atonic drop and absence, atypical absence seizures, and occasionally GTCs alone had a frequency of discharges less than 3 Hz, whereas the remainder subjects had a frequency of discharges greater than 3 Hz.

Table 5: Distribution of the subjects as per the Seizure type

Seizure type	No.	Percentage (%)	Frequency of generalized discharges on EEG
GTCS	30	23.08	2.5-4 Hz
Absences alone	26	20.00	3 Hz
GTCS + myoclonic jerks	18	13.85	3-6 Hz
GTCS + absences	16	12.31	3-4 Hz
Myoclonic jerks	10	7.69	
Absences and myoclonus	8	6.15	3-6 Hz
GTCS + absences + myoclonic jerks	8	6.15	3-6 Hz
Atonic drop	6	4.62	2-3 Hz
Atonic drop and myoclonic jerks	4	3.08	>3Hz
Atonic drop and absence	4	3.08	2-3 Hz
Total	130	100.00	

Abortive generalised bursts of discharges (less than 2 seconds) made up 53.08 percent of the aberrant generalised EEG pattern, whereas bursts lasting more than 2 seconds made up the remaining 46.92 percent. In all 28 kids with JME, photic stimulation increased discharges, whereas hyperventilation caused discharges in 92.30 percent of children with absence epilepsy.

Discussion

Idiopathic generalised epilepsies (IGE) are a set of epilepsy syndromes that overlap. IGE is a prevalent epilepsy type that accounts for 15–30% of all

epilepsies. The diagnosis is based on the International League Against Epilepsy's guidelines for clinical and EEG findings (ILAE). 6 IGE can occur at any age, with the first or second decade of life being the most prevalent, but current research reveal it occurs more commonly in adults than previously assumed^{6,7}. Absence seizures, myoclonic seizures, tonic clonic seizures, and atonic seizures can occur alone or in diverse combinations in subjects. Subjects may be categorised according to the ILAE classification of generalised epilepsies based on the predominant type of seizure, age of

onset of seizures, and EEG features⁸. Childhood absence epilepsy (CAE), juvenile absence epilepsy (JAE), juvenile myoclonic epilepsy (JME), and IGE with generalised tonic clonic seizures alone are the most common disorders found in clinical practise (EGTCSA). In up to one-third of subjects with generalised epilepsy, electroencephalographic (EEG) studies reveal generalised, symmetrical, bilateral, and synchronous spike and slow wave discharges or multispikes and slow wave discharges that can be provoked or facilitated by hyperventilation or photic stimulation. Hyperventilation causes absence seizures, which are characterised by a 3 Hz spike and a large amplitude slow wave during the seizure. However, the absence of EEG alterations in a single examination does not rule out generalised epilepsy, and more investigations or sleep deprivation experiments may be required to show the characteristic abnormalities^{9,10}. Epidemiologic research shows a small male prevalence in epilepsy in general. However, there is a modest female predominance in generalised epilepsy studies, notably in generalised absence epilepsy. More recently, a Danish research discovered that women were diagnosed with IGE at a higher rate than males, and that this disparity was more pronounced in individuals diagnosed with JAE and JME, but not IGE with GTC. The majority of subjects in our research were 16-30 years old (44.62 percent), followed by 31-45 years old (23.07 percent), 6-15 years old (18.46 percent), and 46-60 years old (13.84 percent). Females (61.54 percent) were more afflicted than males (38.46 percent). GTCS alone accounted for 23.08 percent, Absences alone for 20.00 percent, GTCS + myoclonic jerks for 13.85 percent, GTCS + absences for 12.31 percent, Myoclonic jerks for 7.69 percent, Absences and myoclonus for 6.15 percent, GTCS + absences + myoclonic jerks for 6.15 percent, Atonic drop for 4.62 percent, Atonic drop and myoclonic jerks for 4.62 percent. Even after multiple EEG investigations, the EEG pattern was abnormal in 81.54 percent of the cases and normal in 18.46 percent. In all 14 JME subjects, photic stimulation amplified discharges, whereas hyperventilation caused discharges in 92.30 percent of children with absence epilepsy^{11,12}. Abortive generalised bursts of discharges (less than 2 seconds) made up 53.08 percent of the aberrant generalised EEG pattern, whereas bursts longer than 2 seconds made up the remaining 46.92 percent. JME was the only source of poly-spike, spike wave discharges. The word 'generalised' refers to seizures in which the earliest clinical

changes show that both hemispheres are involved. 'At first, the ictal encephalographic patterns are bilateral.' However, the statement is not totally accurate. In the inter-ictal EEG, at least 40% of individuals with idiopathic generalised epilepsies (IGE) have non-localising focal discharges (with or without generalised discharges). Focal discharges were found in 32.30 percent of subjects, with the front-central region being the most common. In 71.42 % of instances, the focal discharges were unilateral, while in the remaining 28.57 %, they were synchronous bilateral. 15.4 % of individuals had occipital rhythmic intermittent delta activity (ORIDA)^{13,14}.

Conclusions

Our research revealed that the majority of the subjects were between the ages of 15 and 30, and that the majority of them were females. GTC alone was the most prevalent seizure type, followed by absence alone and GTC + myoclonic jerks. With IGE, you can see focal discharges, typically from the frontocentral area. ORIDA is also seen in generalized epilepsy, especially CAE. JME is the only way to see polyspike discharges. All subjects with JME had their discharges amplified by photic stimulation, whereas individuals with childhood absence epilepsy had their discharges accentuated by hyperventilation. The most prevalent generalised discharge pattern in EEG was an abortive generalised burst of discharge (less than 2 seconds).

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