

A Study of the First 350 Cases Referred for EEG in Kathmandu Medical College Teaching Hospital

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Abstract

Electroencephalography or EEG is a neurological test that uses an electronic monitoring device to measure and record electrical activity in the brain.

Epilepsy is defined as a recurrent tendency to unprovoked seizure.

About 0.5% to 2% of the population has epilepsy.

Material and Methods

This is a retrospective study of the first 350 odd cases referred for EEG at Kathmandu Medical College Teaching Hospital, Kathmandu during period November 2002- September 2002 (Mangsir 2058- Bhadra 2059).

Results

Most patients fall in the age group of 11-20 years and more than 50% referred cases fall in the prime of life, i.e., 11-30 years. 16% of patients with the history of seizure did not use any AED and 32 % who though had no history of seizures were actually using AED.

It is seen that out of 149 reported normal, 57 (38%) had history of seizure; but out of 208 reported abnormal in EEG only 92 (42%) had history of seizure.

Discussion

EEG is not a very sensitive or a specific tool; however, in our study it was seen to be more sensitive than specific. It is still very useful in classifying seizure types, in locating epileptic focus prior to surgery or in some confusing situation when movement disorder may simulate seizure disorder or vice versa.

Conclusion

Although EEG is not a very sensitive or specific investigation, it is more sensitive than specific.

Electroencephalography, or EEG, is a neurological test that uses an electronic monitoring device to measure and record the electrical activity in the brain. **Epilepsy is defined as a recurrent tendency to unprovoked seizure⁵.**

Seizure disorder is a very common problem and epilepsy is not uncommon in society.

About 0.5% to 2 % of population has epilepsy^{1,4}. However, the incidence of epilepsy is about 70 per lakh population¹. It is a cause of many investigations for doctors and a cause of much alarm for the patients and their relatives.

One percent or 1 out of 100 people in the United States have an ongoing seizure disorder. It affects driving, employment, psychosocial adjustment and every other aspect of life for the patients with a seizure disorder as well as their families.

Diagnosis of seizure and syndrome rely on a detailed history and physical examination and the routine EEG. Unfortunately, up to 30% of patients continue

to have seizures despite medication or have unacceptable side effects of the doses of medications required for controlling their seizures¹. Specific epilepsy syndromes such as complex partial seizures, usually temporal lobe epilepsy and Lennox-Gastaut Syndrome tend to be medically intractable.

Currently, there is little information on EEG recordings, findings although there is recently been a mushrooming of EEG recording machines in Nepal; but so far no data exists about EEG recordings in Nepal. This study aims to bridge that gap and aims to find some baseline information on EEG recording, the abnormal EEG in patients with epilepsy; percentage of patients taking drugs with seizure disorder; patients with no history of seizure disorder but still taking drugs for some reason or other; the

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age groups sent for EEG; percentage of patients with normal EEG and taking drugs; percentage of patient with abnormal EEG and taking drugs; sex distribution with normal EEG and abnormal EEG. Our purpose is also try to probe into specificity and sensitivity of this investigation

Material and methods

This is a retrospective study of the first 350 odd cases referred for EEG at Kathmandu Medical College Teaching Hospital, Kathmandu during period November 2001-September 2002 (Mangsir 2058-Bhadra 2059)

In this retrospective study, the first 350 cases referred to KMCTH were analyzed. A brief history was taken to assess whether the patient really had seizure attack. History was taken from the patient or the witness. However, history of seizure was marked as positive or negative on the face value of the prescription of

the consultant. In those with no history or diagnosis written, clear history was taken to determine whether the patient had history of seizure or not. And these cases were marked as having history of seizure or not on that basis.

A few cases had to be excluded due to lack of proper data.

A SEMI-STRUCTURED performa was made in order to obtain whether the patient had seizure, taking drugs or not, normal or abnormal EEG; age, sex handedness were tabulated accordingly.

Statistical tools

The results were analyzed using SPSS 10.0 version; and the results were analyzed through correlation (Pearson's Correlation).

Sensitivity and specificity tests were done and Chi Square test was used

Results

Table 1: Age and Sex distribution

Age	Male	%	Female	%	Total	%
1-10 yrs	47	13.2%	17	4.8%	64	17.9%
11-20 yrs	51	14.3%	62	17.4%	113	31.7%
21- 30 yrs	41	11.2%	40	11.2%	81	22.7%
31- 40 yrs	29	8.1%	22	6.2%	51	14.3%
41- 50 yrs	11	14. 3%	5	1.4%	16	4.5%
51- 60 yrs	9	2.5%	7	2%	16	4.5%
61- 70 yrs	5	1.5%	1	0.3%	6	1.7%
70 – 80 yrs	1	.3%	-	-	1	.3%
1 day to 11 month	5	1.4%	4	1.1%	9	2.55%
Total	158	55.7%	158	44.3%	357	100%

Table 1 shows the age and sex distribution of patients referred for EEG. It is seen that most patients fall in the age group of 11-20 years and more 50% referred cases fall in the prime of life i.e., 11-30years.

Table 2: History of seizure and medication

		Medication		Total	
H/o seizure		Yes	No		
		Yes	Count	92	57
% of total	25.8%		16.0%	41.7%	
No	Count		114	94	208
	% of total		31.9%	26.3%	58.3%
Total	Count	206	151	357	
	% of total	57.7%	42.3%	100%	

Table 2 analyses history of seizure and the use of medication. It is interesting to note that 16% of patients with the history of seizure did not use any AED and 32% who had no history of seizure were actually using AED.

Table 3: EEG report and history of seizure

EEG report			H/o seizure		Total
			Yes	No	
Normal	Count		57	92	149
	% with in EEG report		38.3%	61.7%	100%
	% of total		16%	25.8%	41.7
Abnormal	Count		92	116	208
	% with in EEG report		44.2%	55.8%	100%
	% of total		25.8%	32.5%	58.3%
Total	Count		149	208	357
	% with in EEG report		41.7%	58.3%	100%
	% of total		41.7%	58.3%	100%

Table 3 makes a comparative analysis between EEG report findings and history of seizure. It is seen that out of 149 reported normal, only 92(62%) had seizure-free history; but out of 208 reported abnormal in EEG, only 92(42%) had history of seizure.

Table 4: Correlation Descriptive statistics

	Mean	Std. Deviation	N
H/o seizure	1.59	.49	357
EEG report	1.58	.49	357

Correlations

		H/o seizure	EEG report
H/o seizure	Pearson correlation	1.000	-.055
	Sig. (2 tailed)	.	.300
	N	357	357
EEG report	Pearson correlation	-.055	1.000
	Sig. (2 tailed)	.300	.
	N	357	357

This table shows that EEG report and history of seizure are negatively correlated (0.055)

but the p value is not significant

Discussion

The total number of patients taken was 357 between the period of October 2001-November 2002 (Ashwin 2058 to Bhadra 2059). Among the patients referred, males slightly outnumbered females: 55.7% males. And most of the cases were right handed; only 5% being left handed. The majority of cases (54.4%) sent for EEG fell between 11-30 years verifying that majority of patients investigated was in the prime of life. There were only 2% of patients above 60 years of age; but 18% of the cases fell between 1- 10 age group.

The abnormal EEGs recorded of the total was 208 out of 357, i.e., 58.3%.

Of the total of 357 patients with EEG, 206 were taking medication (58%) and 151 (42%) were not taking any drugs.

Here an interesting data arises: out of 149 people with history of seizure, 57 (16%) were not on any AED. And Out of 208 with no history of seizure, 114 were still taking AED (31.9%)

It could be that the treating doctors had a high index of suspicion of epilepsy and their threshold of starting AED was very low or that proper history was not taken and epilepsy was mis-diagnosed. Therefore,

one needs to reconsider before starting AED especially because stopping AED-- once started-- is so difficult.

It is interesting to note that out of **149** cases *with history of seizure*, **57** of them had *normal EEG*.

This is natural because it is a known fact that patients with history of seizure may have normal EEG; as EEG is only a “snapshot” of brain activity².

Also interesting to note is that out of 208 patients with no history of seizure, 116 still had abnormal EEG, i.e., of all the patients with *no history of seizure 55.8% of them still had abnormal EEG*. Literature quotes that approximately one in fifty normal population (2%) with no history of epilepsy has IED (interictal epileptiform discharge)³. Thus actually IED s are supportive of an underlying seizure disorder but never diagnostic. (Actually to be diagnostic of Seizure Discharge, an EEG must include a clinical change in conjunction with electrical change.) Without clinical ictal behaviour, EEG with IED is not diagnostic of epilepsy. But the disproportionately large percentage with no history of seizure but abnormal EEG, suggest that perhaps history of seizure could have been missed. So our figure 55.85% (116/208) that had abnormal EEG but no history of seizure would contain only a very small proportion of IED; and they cannot be grouped under epileptics³. In drawing up the correlation, it is seen that history of seizure is negatively correlated with EEG findings. The EEG was found to be *sensitive* by only **61%** (92/149) and *specific by only 44.23%* (92/208).

This is reasonable because all literature quote almost the same figures and it is well known fact that EEG is neither a very sensitive nor a specific investigation.

EEG as an important investigative tool and is more helpful in *classifying the type* of seizure disorder and also helpful to decide *whether to stop the AED* or not. And also selection of appropriate anti-epileptic drugs, monitoring the therapeutic response especially

in absence seizure **(3)**. It may suggest a possible cause for the seizure disorder and explain why some people have deteriorated. In conjunction with videomonitoring, long term EEG recording is critical in evaluation of patients with refractory seizures and for epilepsy surgery.

As far as diagnosing of seizure disorder is concerned, no investigation can replace eye-witness or videotelemetry. However, in certain confusing situation when seizure may simulate a movement disorder, EEG is very helpful. **(3)** EEG provides supportive evidence for clinical diagnosis of epilepsy.

We still need to determine the type of abnormalities or the type of seizure disorder. Etiology of Epilepsy: cerebrovascular disease (CVD): 15%; tumors (6%). Alcohol induced (6%); post traumatic and infective (2%). Unknown cause tops the list: 60-70%. **(1)**

Conclusion

The majority of patients referred for EEG fell in the prime of their life. 16% of the patients with history of epilepsy were not on any AED; and as much as 32% of patients who had no history of seizure was on AED.

Although EEG is neither a very sensitive nor a specific investigation, it is seen to be more sensitive than specific.

As much as 58% of the patients reported as having no history of seizure had abnormal EEG.

References

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