



EEG (ELECTROENCEPHALOGRAPHY) PROFILE IN EPILEPSY

Neurology

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ABSTRACT

Aim: To study the role of EEG profile in patients presenting with Epilepsy.

Methods: This study is done in Epilepsy clinic of Coimbatore Medical College Hospital, from December 2017 to June 2018.

Study Protocol

Patients presented with true seizures activity are included. Patients who had seizures mimics were excluded from the study.

Study Results: This study done in 240 patients presented with seizure activity, children 36 (male - 24, mean age 9.3 yrs), (female - 12 mean age 8.5yrs) total adults - 204 (males 102, mean age - 40.02yrs), (females 102 - mean age 35.76yrs). EEG recording were done using routine EEG protocol. Among 240 patients, 66 patients showed abnormal EEG record in the form of spikes, sharp waves, spike and wave pattern. Focal epileptiform discharge was noted in 51 patients ($p < 0.0001$) generalized epileptiform noted in 15 patients ($p < 0.0001$). Hence EEG is still the more sensitive tool in detecting epileptic activity in the recent era.

Conclusion: EEG is a more sensitive method in detecting the epileptiform activity in patients presenting with epilepsy.

KEYWORDS

EEG profile, Epileptiform activity, Epilepsy.

Introduction:

Epilepsy is the commonest burden to the brain since ancient days. Here we studied the role of Electro Encephalography profile in detecting epilepsy in the recent scientific era.

Aim

To study the role of EEG profile in patients presenting with Epilepsy.

Methods

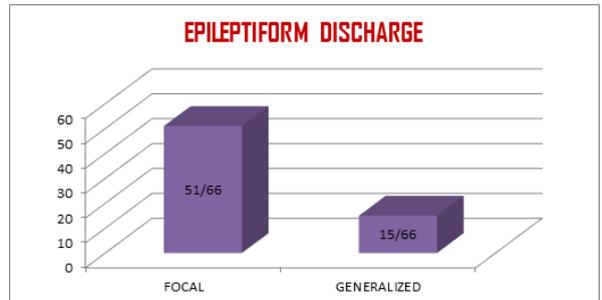
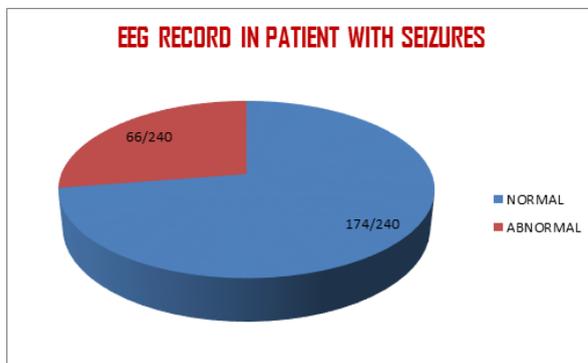
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Discussion:

Epilepsy is a group of neurological disorder characterized by epileptic seizures. The cause of most cases of epilepsy is unknown, the known causes are brain injury, stroke, neoplasm, brain infections, congenital malformation and genetic mutations.

Epileptic seizure are divided into convulsive (60%) and non convulsive (40%) convulsive seizures divided into generalized and focal seizures.

Generalized seizure includes tonic-clonic, tonic, clonic, myoclonic, absence and atonic seizures.

Focal seizures are often preceded by certain auras they include sensory, visual, hearing or smell, psychic, autonomic and motor phenomena.

Those with epilepsy have seizures that are often triggered by specific events and are known as reflex seizures.

Seizure threshold is used to indicate the amount of stimulus necessary to bring about a seizure, seizure threshold is lowered in epilepsy.

In epileptic seizures a group of neurons begin firing in an abnormal, excessive and synchronized manner. This results in a wave of depolarization known as a paroxysmal depolarization shift.

Electroencephalography (EEG) is an electrophysiological monitoring method to record electrical activity of the brain. It is typically noninvasive, with the electrodes placed along the scalp, although invasive electrodes are sometimes used such as in electrocorticography. EEG measures voltage fluctuations resulting from ionic current within neurons of the brain.

Electrode locations and names are specified by the international 10-20 systems.

Electrical activity recorded by electrodes placed on the scalp or surface of the brain mostly reflects summation of excitatory and inhibitory postsynaptic potentials in apical dendrites of pyramidal neurons in the more superficial layers of the cortex.

EEG Wave patterns includes Delta (4Hz), Theta(4-7Hz), Alpha(7-13Hz), Beta(14-30Hz), Gamma(30-100Hz), Mu range (18-30).

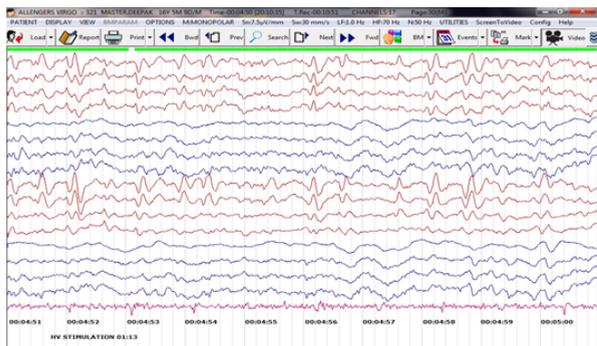
EEG is most often used to diagnose epilepsy also used in diagnose of sleep disorders, depth of anesthesia, coma, encephalopathy and brain death.

EEG abnormalities may be categorized as epileptiform or nonepileptiform. Epileptiform transients such as spikes and sharp waves are the interictal marker of a patient with epilepsy and are the EEG signature of a seizure focus^(1,2).

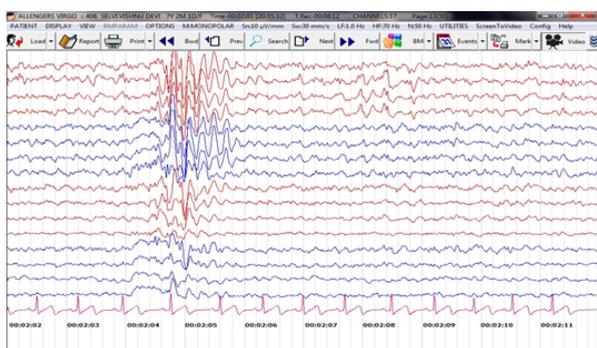
Epileptiform abnormalities categorized as spikes, or sharp waves, a spike is defined as an IED of less than 70 milliseconds in duration and a sharp wave as an IED of 70-200 milliseconds in duration. Generalized epileptiform is discharges tend to be more predictive of seizures recurrence.

EEG continues to play a central role in diagnostic and management of patient with seizures disorders in conjunction with now remarkable variety of other diagnostic techniques developed over the last 30 or so years – because it is a convenient and relatively inexpensive way to demonstrate the physiological manifestations of abnormal cortical excitability that underline epilepsy³.

FOCAL EPILEPTIFORM ACTIVITY



GENERALIZED EPILEPTIFORM ACTIVITY



EEG helps determine seizure type and epilepsy syndrome in patients with epilepsy, and therapy choice of antiepileptic medication and prediction of prognosis. EEG findings contribute to the multi-axial diagnosis of epilepsy, in terms of whether the seizure disorder is focal, generalized, idiopathic or symptomatic, or part of specific epilepsy syndrome⁴.

EEG is used to diagnosis epilepsy in patients with normal neurological examination and imaging features. It is used to differentiate between focal and generalized epileptic activity. In the recent era EEG is used as a biomarker in cognitive brain disorders. In this study EEG showed abnormal electrical activity in the form of spikes, sharp waves, spike and wave forms. A focal epileptic discharge has been more prominent

than generalized epileptic discharge⁵.

Conclusion

EEG is a more sensitive method in detecting the epileptiform activity in patients presenting with epilepsy.

References

1. EEG in the diagnosis, classification, and management of patients with epilepsy – S.J.M.Smith et al.
2. The role of EEG in epilepsy: a critical review - Epilepsy Behav. 2009 May;15(1):22-33. doi: 10.1016/j.yebeh.2009.02.035. Epub 2009 Feb 25.
3. Generalized Epilepsies on EEG - Feb 03, 2017 Author: Selim R Benbadis, MD; Chief Editor: Helmi L Lutsep.
4. The EEG in selected generalized seizures - Hrachovy RA, Frost JD Jr.
5. Focal EEG Waveform Abnormalities-Updated: Nov 10, 2017 - Author: Alexis D Boro, MD; Chief Editor: Selim R Benbadis,