An Audit of Electro Encephalography (EEG) Referral In Tertiary Care Teaching Hospital

Zahid Nazar, Saeed Farooq, Syed Muhammad Sultan, Munir Ahmed, Inayat Ur Rehman, Khalid A Mufti

ABSTRACT:

Objective: The aim of the study is to describe the various findings of electroencephalography in assessing diseases encountered in clinical practice, to audit the use of EEG in a tertiary teaching hospital, and to describe the diagnostic categories in which EEG can be helpful as diagnostic tool.

Design: Descriptive study

Place & Duration of Study: This study has been carried out at Department of Psychiatry Khyber Teaching Hospital, Peshawar. Cases were examined retrospectively over a period of one year from January to December 1998.

Subjects and Methods:

All the record of the patients who had EEG during one year period i.e. from January to December 1998 was examined. Relevant informations were recorded on a performa prepared for this study.

Result:

The total number of request during year 1998 were 971, out of which 570 (59%) were male and 401 (41%) were female. In 588 (61%) cases result was positive and in 383 (39%) was negative. Electroencephalography was helpful in assessing the diagnosis of epilepsy in 344 cases (58%) and delirium in 181 cases (31%).

Conclusion:

This paper highlights the importance of EEG is an important electrophysiological investigation especially in cases of delirium and epilepsy. It is recommended that it should be available in every tertiary teaching hospital.

Key words: Electro Encephalography (EEG), Delirium, Epilepsy

INTRODUCTION

Electroencephalography (EEG) has a wide application in the field of clinical medicine and research. It is an important tool for evaluation of epilepsy, trauma, cerebral tumors, degenerative conditions and disordered metabolic states causing delirium[1]. The distinction of making the first observations of electrical activity of the brain goes to Caton who, in 1875, reported that he had detected currents from electrodes placed on the skull or exposed brain in rabbits and monkeys. However it was Hans Berger (1929), who recorded the first human electroencephalogram (EEG) from electrodes on the scalp. Today the clinical application of electroencephalography is universally accepted and it therefore seems all the more surprising that Berger's original publications were received with skepticism[1]. It was not until some five years later that Adrian and Matthews, in 1934, obtained confirmation of his findings and by a demonstration to the physiological society ensured their recognition[2].

Epileptic seizures were found to be accompanied by major electrical disturbances and Walter (1936) was the first to demonstrate an association between the presence of focal slow waves in the EEG and a cerebral tumour.[3] The EEG is now a days used by doctors in nearly every department. The neurologists employ it as an aid to diagnosis and assessment particularly in patients with epilepsy. The general physicians find prognostic help in unconscious patients after cardiac arrest, and it can be sensitive indicator of impending hepatic encephalopathy in patients with liver disease. The psychiatrists employ it for patients in whom he believes there is an organic basis for a mental disorder. Similarly it has wide applications in the field of Pediatrics, where it can be used for diagnostic and prognostic assessment in cases of epilepsy and brain damage. There are also a wide variety of researches used for EEG in neuropharmacology[4,5]. Due to resource constraints in developing countries EEG is available mostly in teaching hospitals only. Due to limited resources it use has to be cost effective [6,7]. The present study aims to describe the various findings of EEG in assessing diseases encountered in clinical practice and to audit the use of EEG in a tertiary teaching hospital and to describe the diagnostic categories in which EEG can be helpful as diagnostic tool.

SUBJECTS AND METHODS

This is a retrospective study which, has been carried out in department of Psychiatry Khyber Teaching Hospital. The records of all EEG requested during one year period i.e. between first of January to thirty first December 1998 were examined. Relevant information needed was recorded on a Performa prepared for this study. Only those records were included where informations about all the variables to be recorded in this study were available. Following information was extracted form the notes: age distribution of EEG request, clinical findings on history, EEG diagnosis and differentiation of various types of seizure. Seizures were classified according to the International Classification of Epileptic seizures and International Classification of Diseases (ICD-10). The EEG was recorded on

16 channel machine with paper and pen recording methods. The electrodes were placed according to international standards on scalp. The interpretations were done by senior resident and consultant in the psychiatry department.

RESULTS:

The total number of EEG requested during one year period i.e. between January to thirty first December 1998, were 971 out of which 570 (59%) were male patients and 401 (41%) were female patients. In 588 (61%) of cases result was positive and in 388 (39%) cases no pathology was found. Forty percents of all referrals were from Department of Psychiatry, Khyber Teaching Hospital while other hospital and private clinic referrals contributed 17%. The total referral from paediatric unit comprised of about 15% approximately. The number of referral from medical units of Khyber Teaching Hospital and other hospitals constituted 8%. The numbers of requests from intensive care unit were 7 %. About two third of the patients were in the range of 16-69 years. The detailed breakdown of age distribution is given in table I. In more than half of the cases epilepsy was the main diagnosis followed by deliriums. Detailed diagnostic findings are shown in table II. Details of diagnosis of various types of seizure are shown in table III.

DISCUSSION:

In this study the main source of referrals for EEG was from Psychiatry Department followed by Paediatrics and medical units. The psychiatrists were interested in diagnosis of seizure disorders, differentiating its various types and differentiating between epileptic and non epileptic fit. From paediatric unit the main reason for referral was diagnosing and differentiating various type of epilepsy. Similarly from medical unit the main reason of referral was assessment of epilepsy, delirium and encephalopathy (especially hepatic).

In this study the most frequent question asked was to exclude epilepsy. It is stressed here that diagnosis of epilepsy is essentially a clinical one. We would also like to stress here that to get the best out of an EEG requires a dialogue between the referring doctors and the EEG staff[4].

The age distribution of EEG referrals found in this study is in general similar to other studies [8,9, 10]. Lam et al[4] reported that the clinical situations most commonly associated with abnormal EEGs were a seizure disorder, suspicion of organic mental disease based on history or physical or mental status examination. Similarly in this study seizure disorder (58%) and delirium (31%) were the two most prominent diagnoses. As Lam et al pointed out the EEG is best in diagnosing seizures disorder and delirium and has much less specificity for other brain diseases such as dementia, strokes, tumours or sub-dural haematomas [11, 12.] It appears that EEG is helpful in identifying seizures disorders and discriminating in various types of seizures, which have bearing on management and final outcome of the disease. The wide spectrum of the diagnosis and age group in which EEG ha been used shows that investigation in helpful in almost all the specialty. EEG is mainly employed by the neurology as a diagnostic tool. However, this study shows that it is also very helpful diagnosis tool which should be available to the psychiatry department. This is mainly due to fact that psychiatrist have been dealing the epilepsy in our country. In view of the fact that a significant proportion of patients with conversion disorder present mostly in the form of pseudosiezures, the value of EEG as a diagnostic tool in psychiatry is further enhanced. The wide acceptance of the service of EEG provide by the Psychiatry Department is reflected in the wider sources of referrals in this study.

Table –I: Age Distribution of EEG Requests:

S.NO	Age In Years	No. of patients (971)	PERCENTAGE (100)
1.	0-1 Years	39	4%
2.	2-5 Years	49	5%
3.	6-15 Years	117	12%
4.	16-69 Years	709	73%
5.	70 and above	57	6%

Table II: Diagnostic findings on EEG

S.No	Diagnosis	No. of patients	%AGE
1.	Epilepsy	344	58%
2.	Delirium (infections)	181	31%
3.	Cerebral tumour	21	04%
4.	Sub-acute Sclerosing Panencephalitis (S.S.P.E)	16	03%
5.	Encephalopathies	12	02%
6.	Brain Death	07	01%

7.	Head injury	07	01%
Total		**588**	**100%**

Table III: Diagnostic break Down of Various Types of Epilepsies

S.No.	Diagnosis	No. of patients	%age
1.	Generalized Tonic Clonic seizures (Grand- Mal Epilepsy)	180	52%
2.	Absence seizures (Petit –Mal Epilepsy)	40	12%
3.	Febrile convulsions	40	12%
4.	Temporal Lobe Epilepsy (Psychomotor Epilepsy)	30	09%
5.	Neonatal Epilepsy	26	07%
6.	Post-Traumatic Epilepsy	20	06%
7.	Jackosonian Epilepsy	20	06%
8.	Infantile spasms	04	01%
Total		344	100%

CONCLUSION AND RECOMMENDATIONS:

The total numbers of referrals in one year period were one thousand. This reflects the high demand for EEG in tertiary teaching hospital. It is also obvious that EEG has been requested from almost all the disciplines and for a large number of diagnostic decisions. In this context it is unfortunate that most teaching hospitals including the index hospital in which the study has been carried out there is no provision for dedicated EEG services.

The result of present study highlights that EEG is an important electrophysiological investigation and should be provided in by an electrophysiology department equipped wit facilities for various electrophysiological studies.

REFERENCE

1. Kiloh L.G et al. Clinical Electroencephalography, 4th Edition 1981 Butterworth.
2. Donalt Scott. Understandng EEG 1975 Gerald Duckwarth and Con Ltd.
3. Driever M.V and Mac Gillivray B.B. Electroencephalography. In Laidlaw J. and Richens A. (eds). A Text Book of epilepsy London 1982. Churchill Living stone.
4. Lam RW, Hurwitz TA, WADA. J. A: The clinical use of EEG in a general psychiatric setting: Hospital Community Psychiatry 1988. 39:533-6.
5. Nunez P.L. Electircal fields of the brain. The Neurophysis of EEg. New York Oxford University Press 1981.
6. Nasar M, Khan S, Akhtar M. A. Epilepsy in rural community of Pakistan: A description of one hundred patients J Coll Physicians Surgeon Pakistan 2002. 12 (12): 728-30.
7. Akhtar I A, Lannaccone S T, Ilyas M S, Abdullah M, Saleem S,. Epidemiology of Epilepsy in Pakistan: review of literature. J Pak Med Assoc 2003. 53, (12):594-6.
8. Adeuja AO, Aderanti CO. Utilization of the electroencephalographic (EEG) service in a tertiary health care institution: a six year study. Afr J Med Med Sci 1999. 28(1-2):91-6.
9. Mohammad Imtiaz, Tahira S Lzhar, Noreen Akmal. Electro- Encephalographic findings and clinical sympthomatology in 50 cases of complex partial seizures. Paksitan Paediatric Journal 1997. 21 (2):81-5.
10. Smith D Bartolo, R. Pickles PM, Tedman BM. Request for electroencephalography in a district general Hospital: Retrospective and prospective audit BMJ 2001. 322 (7292) 954-7.
11. Nicolaides P, Appleton RE, Beirne M. EEG requests in paediatrics:an audit Arch Dis Child 1995.72(6):522-3
12. Heath J, Thomas B. Requests for EEG services in a district general hospital. Distinction needs to be made between audit and value judgment BMJ 2001. 13; 323 (7317):865-6.
13. Stagass et al. Psychiatric diagnostic discriminations with combinations of quantitative EEG variables. Br.J. Psychiatry 1984. 144-581.
14. Grabb J.A., Weinbrger Dr. Morihisa J.M: Electroencephalogram and evoked potential studies of schizophrenia, in Hand Book of Schizophrenia Vol. The neurology of schizophrenia. 1986. New York, Elsevier.
15. Fenwick P. EEG studies in: Reynolds E.H and Trmble E.R (eds). Epilepsy and Psychiatry 1981, London, Churchil Living Stone.
16. Scott D.F and Schwartz M.A. The EEG in Schizophrenia and Depressive States. British Journal of Psychiatry, 1975. 126-408.