

EEG referral pattern in a tertiary care teaching hospital : a retrospective study

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ABSTRACT

Background : EEG is widely available and is an important tool in the diagnosis of many neuropsychiatric disorders. Considering its low sensitivity, appropriate referral for EEG is vital.

Methodology : All the EEG requests and reports in a 6-month window from the EEG clinic at a tertiary care teaching hospital were included and analyzed in the study. Published guidelines and expert opinions were used to determine the appropriateness of the referral.

Results : The study sample included 499 EEG's, of which 48% were inappropriately referred. Common inappropriate requests included 1) Rule out epilepsy, 2) evaluate febrile seizures, pseudoseizures, headaches and funny turns and 3) monitoring of disease progression in epilepsy without a change in type of convulsion.

Conclusions : Inappropriate EEG referrals are seen at a general hospital. Misconceptions about the diagnostic capabilities of EEG may be the root cause for such referrals. Educating the physicians and residents about EEG's diagnostic capability and limitations may address this issue.

Keywords: EEG, electroencephalogram, general hospital, referral.

INTRODUCTION

Electroencephalogram (EEG) is used extensively by psychiatrists, neurologists, pediatricians and physicians for evaluating normal as well as abnormal neural activity [1]. A timely EEG can help detect as well as classify epilepsy and can provide a useful pointer towards effective treatment strategies [2]. EEG is also helpful in confusional states, encephalitis, prion diseases and metabolic encephalopathies. However EEG has its limitations. It has sensitivity of 25-56% and specificity of 78-98% [3]. Studies have shown epileptiform discharges in patients with neuropsychiatric disorders even in absence of epilepsy and in healthy volunteers [4-5]. Thus the judicious use of EEG is vital.

There is a possibility for EEG requests to be unnecessary or in-appropriate [6]. Common inappropriate referrals include requests to “exclude epilepsy”, “therapeutic monitoring of epilepsy” or “evaluate headache/giddiness/syncope/funny turns”. Literature has shown that as high as 40% of the requests for EEG were inappropriate and more than half the referring doctors believed that EEG can diagnose or exclude epilepsy [7-8]. There is a need of such audit studies in Indian setting. Such scientific audits can help in detecting such misconceptions in a multispecialty tertiary care teaching hospital. Thus, detecting and addressing such misconceptions can pave the way for an optimal and

beneficial EEG use. A prior study has already demonstrated that, a change in referral policy reduces the routine EEG requests, and a raise in the impact it had on management by 37% [9]. This study was planned considering the need of such projects in an Indian setting. The aim was to conduct a retrospective audit of EEG clinic at a tertiary care teaching hospital and evaluate the referral patterns.

METHODOLOGY

The study was conducted at the EEG clinic run by the Department of Psychiatry in a retrospective chart review design after approval from the Institutional Ethics Committee. All the EEG records, including EEG requests and EEG reports referred to the EEG clinic from 1st January 2014 to 30st June 2014 were screened. Files with properly filled requisitions and reports were then included in the study. Each EEG request and report was assessed on certain parameters on a self-designed proforma. Parameters assessed were clinical features, presenting complaints and indication for the EEG. Clinical guidelines [3, 10] and published expert opinion [8, 11] for the proper utilization of EEG were used to determine appropriateness of the referral. Referrals were considered inappropriate when EEG was requested to 1) exclude/rule out epilepsy, 2) evaluate syncope, headache and febrile seizures and 3) assess disease progression in a diagnosed case of epilepsy without any recent seizure.

EEG findings were also recorded in the study. It was assessed whether 1) the EEG was helpful in the case or not, 2) the EEG confirmed the diagnosis or gave a different diagnosis, 3) the EEG helped in the localization of the pathology. The data was pooled in a spreadsheet and analyzed using descriptive statistics using Microsoft Excel for Mac 2016.

RESULTS

CLINICAL PROFILE OF THE STUDY SAMPLE

A total of 499 EEG's were recorded during the study period, and were all included in the study. 69% patients (345/499) were diagnosed cases of epilepsy and other neurological diagnoses such as encephalitis, stroke, injury and infections, developmental disorders such as mental retardation, cerebral palsy and autism and psychiatric diagnoses such as substance use disorders. 76% patients (380/499) were referred after a convulsion, 17% of those (65/380) were diagnosed cases of epilepsy. Other presentations included headache (1%), fever (9%) or other general medical conditions and episodes of giddiness/dizziness or syncope (2%).

EEG REFERRAL PATTERN

Departments of internal medicine, pediatrics and psychiatry referred 96% of all the EEG's, with the remaining being distributed across other specialties. 67% of the EEG requests (Table-1) were made for evaluation of the presenting symptoms. It was followed by requests to "rule out" neuropsychiatric diagnoses (20.4%). In 11% of the cases, EEG was as a therapeutic monitor. 48% of all the requests were found to be inappropriate (Table-2).

Table 1 – Clinical presentation and indications for EEG (n=499)

Indication	Rule Out	Evaluate	Monitor/Disease Progression	Not mentioned
Epilepsy	75	258	45	6
Febrile seizures	11	33	1	8
Headache	0	16	0	0
Pseudoseizures	6	29	0	0
Syncope/dizziness	2	6	0	2

Table 2 – Inappropriate requests (n=241)

Indication	Number(%)
Rule out epilepsy	95 (39%)
EEG as a therapeutic monitor	46 (19%)
Evauate febrile seizures	33 (14%)
Evaluate pseudoseizures	29 (12%)
Evaluate headache	16 (7%)
Not mentioned	16 (7%)
Evaluate syncope/giddiness/funny turns	6 (3%)

EEG was normal in 73% of the cases. Among the abnormal EEG's (n=134), 52% showed epileptiform discharges, 31% showed encephalopathic findings, 15% showed hemispheric dysfunction and 1% showed non-specific findings. 30% of the abnormal EEG's showed a focal, 61% showed diffuse or generalized and 9% showed multifocal pathology. EEG confirmed the clinical suspicion or indication in 14% cases, suggested a different diagnosis in 13% of cases. EEG helped in localizing the laterality of the lesion in 10% cases, and the site of the pathology in 8% of cases. Epileptiform discharges were observed in 13% of patients with clinical suspicion of epilepsy, in 23% patients already diagnosed with epilepsy and in 30% of already diagnosed patients with epilepsy who presented with a convulsion.

DISCUSSION

The key finding in this study was the “appropriateness” of the indication for EEG. We found 48% of all EEG requests to be inappropriate. Prevalence of inappropriate referral in existing literature was found to be 44% [8] 55% [11] 46% [12] and 26% [13]. Misconceptions about the clinical utility of EEG maybe at the root of inappropriate requests. With an educative, non-judgemental approach inappropriate requests do reduce and EEG's role in management does rise [11]. Thus to conclude, inappropriate referrals to EEG do occur and can be a source of worry in a general hospital setup. There is a need for such multi-centric studies to assess the extent of this problem in clinical settings to arrange for educational programmes for physicians to rectify this issue. Limitations to the study include small sample size and retrospective design. We did not include requests for video EEG in the study.

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