Original article:

A video-EEG analysis of 110 cases from a tertiary care teaching hospital in Indore

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Abstract:

Introduction: Video-electroencephalographic (VEEG) monitoring is an essential diagnostic and management tool in epilepsy. Duration of VEEG recording has been variable depending case to case. To analyze the VEEG data of patients with respect to utility towards epilepsy and non epileptic events.

Material & Methods: The study was hospital based, retrospective and descriptive. Data of 110 patients referred for VEEG during 2010-2012 were analyzed on predefined variables.

Results: The VEEG was able to contribute towards the diagnosis in 89% patients. Therapeutic alterations after VEEG helped 75% of patients. Forty six percent patients were confirmed as psychogenic non-epileptic events. Eighty seven (87%) of psychogenic non epileptic seizures were recorded in the first 8 hours of VEEG.

Conclusion: It is recommended that short term VEEG for suspected psychogenic nonepileptic seizures are utilized more, especially in resource poor countries.

Key Words: video-EEG, epilepsy, psychogenic non-epileptic events

Introduction:

Video-electroencephalographic (VEEG) monitoring is an essential diagnostic and management tool in epilepsy [1] .Inpatient long-term VEEG has various advantages. In particular, VEEG is considered a gold standard in the diagnosis of pseudo seizures or psychogenic non-epileptic seizures(PNES).[2] Although useful, it may be inconvenient due to cost of hospitalization, availability of well trained staff for 24 hours and additional stress to families of patients with epilepsy. This becomes especially important in resource poor developing countries [3]. To overcome the constraints of prolonged monitoring, many studies have tried to use shorter monitoring time. Most of these studies have shown that even short-term recording helps distinguish between epileptic and non-epileptic events, and can help classify different seizure types.[4] Few Indian studies have assessed the role of short term, outpatient VEEG in epilepsy.[5] Not much demographic data is available on this issue from central India. Present study was undertaken to investigate the role of short-term VEEG in detecting the nature of abnormal events and to find out the utility of VEEG in confirming or classifying the referring diagnosis.

Material and Methods :

All the EEGs were done in the Department of Neurology, Sri Aurobindo Medical College and PG Institute. The study design was descriptive, retrospective and hospital-based .Data of all the patients referred for VEEG between 2010-2012 were noted in excel sheet and analysed on predefined variables .Informed consent was taken and a reliable attendant was a witness to cross

check the semiology of the events recorded. The event was used for abnormal movement or clinical diagnostic problem for which the patient was referred. Relevant details regarding patient's history and the initial diagnosis of the referring physician were recorded. The number and timing of the events were recorded. The data was reviewed by qualified neurologists independently and patients diagnosis were revised as per the International League Against Epilepsy classification. Patients were labeled finally on the basis, whether the initial diagnosis was confirmed or classified with VEEG. All recordings were done on Nicolet Viasys clinical VEEG system. All antiepileptic medications were stopped unless a risk of precipitation of seizure outweighed the importance of diagnostic information. An event switch was placed near the patient and functions were explained to him and his attendant. Room temperature was maintained around 25 degree centigrade. Suggestions as per protocol were given to the patient.

Final Diagnosis	No. of patients (%)
Confirmed	47 (42%)
Revised	52 (47%)
VEEG Useful in	98 (89%)

Table 1.Diagnosis revision after VEEG

Duration of appearance of events	No.of patients(%)
<8HOURS	36(33%)
8-12HOURS	29(26%)
12-24HOURS	29(26%)
>24HOURS	06 (5%)
TOTAL	110

Table 2.Duration of appearance of events in VEEG

Treatment Unchanged	28(25%)
Treatment Withdrawn	39(35%)
Treatment Added	43(40%)
Treatment Decision Helped	(75%)
TOTAL	110

Table 3.Therapeutic impact of VEEG on treatment

Results

Total of 110 patients were analyzed during the period of study. The referring source included general physicians, pediatricians & neurologists. The age of the patients ranged from 3 months to 64 years. Maximum patients were of age group 11-20 years followed by 21-40 years .Eighty eight percent of patients were under 40 years of age with an equally distributed male–female ratio along all age groups. The referring diagnosis was epilepsy in 36%, pseudo seizure in 16% & abnormal sleep related movements in 18 % cases. Thirty percent patients were referred as epilepsy but with added suspected pseudo seizure. Overall a total of 340 events were recorded. After the VEEG initial referral diagnosis was confirmed in 42% cases. The initial referral diagnosis was revised in 47% patients (Table1). Thus VEEG was able to contribute towards the diagnosis in 89% patients. In 33% of patients events could be recorded in the first 8 hours of the study (Table 2). In next 4 hours i.e. (8-12hr) events were recorded in 26%.Another 26% had the event in 12-24 hour period. Only 5% patients had required VEEG recording beyond 24 hours. Most patients (70%) had 1-3 events in their study but there were patients who had > 10 events in their study .Thirty five percent patients had their treatment withdrawn after the VEEG and in another 40% the treatment was revised (Table3). Overall of all the events forty six percent patients were confirmed as pseudo seizures and the remaining 50% could be categorized as a particular seizure type. Only in one patient could not be confidently diagnosed even after VEEG. A sub analysis of patients with the initial diagnosis of pseudo seizure revealed that 54% had the diagnosis revised. Eighty seven percent of PNES were confirmed in the first 8 hours of VEEG. Only 13% of events got confirmed beyond 8 hour period in VEEG.

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Discussion

In a VEEG study of 41pediatric patients from Mumbai, clinical events were recorded in 68.2% and modification of therapy was achieved in 51.2% [5]. In a study from Pakistan, a large number of referrals were for pseudo seizures which were confirmed on VEEG [6]. Sigurdardottir's population based VEEG study found an incidence of 1.4 in 100,000 for pseudoseizures, equal to almost 4% of that reported for epilepsy [7]. Benbardis estimates a prevalence of 2-33 per 100,000, making PNES a significant neurological condition. The prevalence of co-existing epilepsy and non-epileptic seizures also depends on the population studied and ranges between 5-50% [8]. Unlike these studies our study had a larger number of patients and we also did a subgroup analysis according to the duration of study. The contribution of VEEG towards final diagnosis (89%) was higher in this study. In 75% patients drug modifications could be possible in the form removal or reduction of antiepileptic or a change in the therapeutic regimen as per the revised diagnosis or classification of seizure. This change was also seen in patients referred by qualified neurologists and epileptologist, highlighting the fact that though epilepsy is a clinical entity but at times presentations can be bizarre. Where non-epileptic seizures are misdiagnosed, ongoing disordered functioning is reinforced, establishing illness behavior and the underlying psychological factors are not addressed. This also contributes to health and economic costs[9] .In our series 71 patients were referred by neurologists, 25 of these were diagnosed as PNES and 7 had their diagnosis revised after VEEG.This shows that diagnostic inaccuracy is not uncommon even in people specialized for evaluation epilepsy clinically. This difficulty of diagnosis or misdiagnosis is well recognized in literature [10,11].Due to these factors the correct diagnosis usually gets delayed considerably(12). Reuber et al report a mean delay of 7.2 years [11]. Younger age, interictal epileptiform potentials in the EEG and anticonvulsant treatment were associated with longer delays. Apart from direct medical harm from inappropriate treatment, these patients also carry a significant psychiatric morbidity from suicide or attempted suicide [9].

In our study, 87% of PNES were recorded in the first 8 hours of VEEG .Only 13% of events required VEEG beyond 8 hour period & that too led to detection of events in 8-12 hour period in most cases. Psychogenic events may be very similar and appear stereotyped and even mimic epileptic events in terms of injuries and incontinence [10]. Our study clearly shows how commonly this misdiagnosis occurs & how significantly VEEG can impact the diagnosis & thus the treatment. Parra et al found that 96% had had their diagnostic PNES events spontaneously, within 48 hours of in-patient monitoring [12]. In McGonigal's study, 66% of patients randomized to simple suggestion and an expectation that an event would occur during a standard out-patient EEG had a diagnostic PNES [14]. Benbadis reported a higher yield of 84% in their own small study [8].

In another Indian pediatric study where duration of the VEEG recording was 3-6 hours, 78% had clinical events whereas 38% had PNES [5].This somehow relates to our results (36%) although we included adults as well as children. This emphasizes the fact that PNES can be seen across all age groups .Although the detection of PNES was more in patients below the age of 40, it was also seen in patients of higher age. Short-term (i.e.8 hr) VEEG altered the clinical diagnosis in 47% patients in our study, higher than many other studies. Connolly et al studied 43 children with intractable daily seizures using VEEG recording of 2-3 hours duration [15].Event detection rate was 83% as compared to 89% in our series. Seizure

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classification was possible in almost all the patients. Rowan et al studied day time monitoring for 6-8 hours, events were recorded in 55% of all patients [16]. We could record events in 33% patients in the 1st 8 hours of study. The likelihood of recording a seizure does not necessarily increase with recording time. The point of diminishing returns appears to be reached by 24 hrs but its 8 hrs only when the suspicion is PNES. [8]. this trend is also highlighted in our patients where only 5% patients had an event after 24 hours of VEEG.

Limitations of our study are that the data of seizure frequency was not available in all the patients. The higher yield of events in short term recordings, as in our series, could be due to the inclusion of patients with frequent seizures. Seizure type also affects the success rate of VEEG recording. Again a large number of our patients turned out to have PNES, which have a tendency to occur in clusters and be very frequent especially in an environment of medical personnel. Absences, PNES and CPS tend to be more frequent and hence have a higher event rate as compared to grand mal seizures. In diagnosing PNES it is essential to confirm that the event identified was stereotyped and typical.

Conclusion

Short-term VEEG is a useful method for cases where the clinical suspicion is more of PNES. Even specialist can make misdiagnosis in seizure cases when the clinical presentation is bizarre. VEEG impacts the therapeutic decisions significantly as the irrelevant antiepileptic can be modified early .It is recommended that short term VEEG be used for PNES more often , especially in resource poor countries.

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