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Antiepileptic Drugs and Cognitive Impairment in Epileptic Patients at a Private Hospital

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ABSTRACT

Adverse effects of antiepileptic drugs are considered by patients to be at least as important as repetitive seizures in terms of quality of life. Antiepileptic drugs induced toxicity is frequent and contributes to a high proportion of treatment failures. Cognitive impairment is the common adverse effect seen with antiepileptic drugs that directly affects the quality of life of the patients. So it is important to compare the cognitive function of epileptic patients with antiepileptic drugs and without antiepileptic drugs. Study was carried out in 100 bedded Private Neuro hospital for the period of six months. All type of epileptic patients (ambulatory patients) was included in this study to compare Cognitive functions. Epileptic with any other co-morbid condition and Children (below 13yrs) and tumor were excluded from the study. Mini mental status examination and WAIS-R test has been performed in the study population. The total number of epileptic patients were included in the study site during study period were found to be 200. The study population divided into two groups i.e. Group A- Newly diagnosed epileptic patients and Group B- Epileptic patients with antiepileptic drug treatment. Gender distribution of the study population indicates a predominant male population in both Group A (58%) and Group B (56%). The average age of the overall study population was found to be 26.23±13.73 (13-65) years and 25.26 ±14.76 (13-64) in Group A and Group B respectively. The investigation was made to compare the cognitive level between Group A and Group B and the result indicates that poor cognitive performance by the Group B (Epileptic patients under treatment with Antiepileptic drugs for at least one year) and better cognitive performance by the Group A (Newly diagnosed Epileptic patients). P value is <0.001 in all Mini mental status examination and WAIS-R test. It shows there is significant difference between the Group A and Group B in Cognitive level. This study recommends that a systematic and careful monitoring of cognitive function should be performed in the management of epilepsy in order to achieve the quality of life in epileptic patients.

Keywords: Epilepsy, Patients, Adverse effects, Cognitive impairment, quality of life.

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INTRODUCTION

The epilepsies are common and frequently devastating disorder, WHO estimates that eight people per 1000 worldwide have this disease. The prevalence of epilepsy in developing countries is usually higher than in developed countries it affecting approximately 2.5 million in USA alone. Over half of the 50 million people with epilepsy worldwide are estimated to live in Asia [1]. It is estimated that there are 55, 00,000 persons with epilepsy in India [2]. Adverse effects of antiepileptic drugs are considered by patients to be atleast as important as repetitive seizures in terms of quality of life. Anti epileptic drugs (AEDs) toxicity is frequent and contributes to a high proportion of treatment failures. Despite its high prevalence and clinical relevance, screening for adverse effects to antiepileptic drugs is not systematically induced in every day clinical practice. Acute adverse events are probably, the most frequently recognized by patients and physician, since it occurs with almost every AEDs that are highly predictable and dose dependent. The most common adverse events include somnolence, dizziness, ataxia, diplopia, blurring of vision, fatigue, vertigo, and cognitive dysfunctions [3]. Cognitive impairment is a frequently occurring secondary consequence of epilepsy. Cognitive function is higher-order behavior involving the capacity of the brain—specifically of the cortical structures—to program adaptive behavior, to solve problems, to memorize information, and to focus attention The exact cause of cognitive impairment in epilepsy has not been explored fully, but three factors clearly are involved:

- Etiology of epilepsy
- Seizure Activity
- Central nervous system side effects of drug treatment [4]

The relationship between epilepsy and cognitive impairment and the detrimental effect on cognitive function associated with some antiepileptic drugs is well established; however, the effects on individuals with epilepsy in terms of quality of life are less well understood. A survey of individuals with epilepsy to gather information about experiences relating to cognitive impairment and epilepsy, effects on areas of quality of Life and perceptions on the likely contributing factors to impaired cognitive function. The patients that they experienced difficulties ‘moderately’ or ‘very much’. Sleepiness / tiredness, slowness of thought and difficulties learning something new were the most frequently reported indicators of cognitive impairment. Two-thirds of respondents stated that the difficulties reported in areas of cognitive function were related to their condition or AED therapy, with 41% attributing cognitive impairment to a combination of their condition and medication, 16% associating cognitive impairment with their medication alone and 9% attributing difficulties experienced to their epilepsy. No significant relationships were found between factors or individual indicators of cognitive impairment and sample characteristics including age, time on medication and mono / polytherapy. The strongest correlations between variables and sample characteristics found were: increasing age and the likelihood of memory impairment. The reduced quality of life associated with polytherapy cognitive function had prevented them from achieving a goal and



50% stated that their quality of life had been adversely affected ('moderately' or 'very much') including:

- Work (48% of respondents)
- Education (46%)
- Relationships (48%)
- Leisure pursuits (44%) [5]

Cognitive impairment lead to defect in the quality of life is inducing difficulties to the physician in the antiepileptic drug therapy in terms of selection of drugs. Cognitive level and quality of life in patients, who were receiving antiepileptic drug therapy, were studied in the above said references on various international populations. So this study was planned to compare the cognitive level epileptic patients treated with antiepileptic drugs and newly diagnosed epileptic patients.

METHODOLOGY

Study site

100 bedded Private Neuro hospital, Erode.

Patient selection

Inclusion criteria: All type of epileptic patients (ambulatory patients) and divided into two groups.

Group A- Newly diagnosed Epileptic patients.

Group B- Epileptic patients under treatment with Antiepileptic drugs for at least one year.

Exclusion criteria: Epileptic with any other co-morbid condition like head injury, stroke, trauma, congenital malfunctioning, mental sub normality, Children (below 13yrs) and tumor were excluded from the study.

Study design

Prospective study

Design of data entry format

A separate data entry format for incorporating patient details was designed. The format contains the details such as name, age, sex, height, weight, Outpatient Number, past medical history includes onset of disease, duration of treatment, and any alternative therapy followed,

past medication history, education, social, and family history, marital status, lab investigation, diagnosis, compliance or non compliance drug chart commonly for all prescribed drugs.

Design of patient consent format

The consent from the patient was obtained before included in the study.

Mini mental status examination (MMSE) [6]

The mini mental status examination (MMSE) OR Foletoin test is a brief 30 point question that test is used to screen cognitive impairment the format contains the details such as patient name, questions for assessing orientation, registration, attention and calculation, recall, language includes naming repetition, 3-stage command, reading, writing, copying.

WAIS-R test [7-11]

The format contains details such as name, age, sex, prescribed antiepileptic drugs and score for each test such as digit span test, recall test, similarities, picture arrangement, and attention test total score in percentage are included in the format.

Statistics

Paired T test (SPSS 9.0 version) was performed to compare the cognitive level of Group A and Group B.

RESULTS

Table.1 Mini mental status examination (MMSE) and WAIS-R test in Group A and Group B population

S.No	Parameter	Experiment	N	Mean	SD	t value	P value
1	MMSE	Group A Vs	100	24.50	2.573	17.753	<0.001*
		Group B	100	15.70	2.517		
2	Digit span	Group A Vs	100	63.00	12.817	5.794	<0.001*
		Group B	100	47.20	14.147		
3	Recall	Group A Vs	100	66.40	11.385	6.556	<0.001*
		Group B	100	48.60	14.709		
4	Similarities	Group A Vs	100	66.20	14.126	4.848	<0.001*
		Group B	100	49.60	18.621		
5	Picture Arrangement	Group A Vs	100	68.00	13.997	7.037	<0.001*
		Group B	100	47.60	13.180		
6	Block design	Group A Vs	100	66.40	11.385	5.697	<0.001*
		Group B	100	50.30	17.155		

The total number of epileptic patients were included in the study site during study period were found to be 200. Group A and Group B consist of each of 100 patients. Gender

distribution of the study population indicates a predominant male population in both Group A (58%) and Group B (56%). The average age of the overall study population was found to be 26.23 ± 13.73 (13-65) years and 25.26 ± 14.76 (13-64) in Group A and Group B respectively. The investigation was made to compare the cognitive level between Group A and Group B and the result indicates that poor cognitive performance by the Group B (Epileptic patients under treatment with Antiepileptic drugs for at least one year) and better cognitive performance by the Group A (Newly diagnosed Epileptic patients). P value is <0.001 in all Mini mental status examination and WAIS-R test. It shows there is significant difference between the Group A and Group B in Cognitive level. It is given in **Table.1**

DISCUSSION

The management of epilepsy includes free from seizure and minimal adverse effects of anti epileptic drugs. Seizure freedom is the “Gold standard” of epilepsy treatment. However, lack of significant anti epileptic drug side effect is equally important and now quite feasible, leading to modern goal of “no seizure, no side effects”. Adverse events to AEDs include all reactions related to their administration, regardless of etiology. They can be classified according to severity, occurrence, and organ system toxicity, and mechanism involved. Cognitive difficulties are common in patients taking AEDs, and frequently rated as the most worrisome adverse events. None of them is exclusive to any individual drug, as all AEDs particularly when given in high doses, can produce cognitive adverse events. Cognitive adverse events are difficult to study since cognitive symptoms in patients with epilepsy may be caused by underlying brain Pathology, co morbidity, recurrent seizures, and social isolation, in addition to the AEDs. One study reported that the following factors have a predominant effect on cognitive function. The type of epilepsy influences the stable effects, which are those functions which require the accumulation of knowledge over long period of time. The type of epilepsy also influences mechanistic cognitive processes, memory or the effect caused by the alteration of the verbal memory, observed in patients affected by symptomatic focal epilepsy the concept of “sub clinical epileptic activities” or EEG discharges could be associated with “transient cognitive alterations” [12]. In this study finding shows that AEDs induced cognitive impairment and deficit in quality of life might be due to the after initiation of drug treatment. The cognitive performance of the Group B patients in this study was significantly poorer than the Group A. P value <0.001 statistically significance. Our results are in accordance with those obtained by a study in which neuropsychological assessments, particularly the WAIS-R, were performed in adult patients with epilepsy and normal volunteers. These investigations, in general, aimed at overall alterations of cognitive function. The performance of the patients in this study was significantly poorer than that of the controls [13]. In this study finding shows that AEDs induced adverse effects, cognitive impairment, and defect in quality of life might be due to alter the initiation of the drug treatment. So, the patients should be monitored routinely in order to minimize the cognitive impairment and also to improve the quality of life.

CONCLUSION

Adverse events caused by AEDs have a significant impact on the patient's quality of life. Patient with epilepsy and/or anti epileptic therapy affects cognition. Cognitive dysfunction which includes memory impairment, psychomotor retardation, inattention, lack of concentration, and reduced motor activity. This study recommends that a systematic and careful monitoring of adverse events should be performed in the management of epilepsy.

REFERENCES

- [1] Tu Luong Mac, Duc-Si Tran, Fabrice Quet, Peter Odermatt, Pierre-Marie Preux, Chong Tin Tan. *Lancet Neurol* 2007; 6:533-43.
- [2] Sridharan R. *Currsci* 2002; 82(6):664-70.
- [3] Rafeal Tolendano, Antonio Gil-nagel. *Seminors in Neurology* 2008;28(3):317-27.
- [4] Albert P, Alden kamp, Marc Krom and Rianne Reijs. *Epilepsia* 2003;44(4):21–29.
- [5] Hilary Mounfield, Peter Dahlqvist, Mike Glynn et al. An international perspective 2004/2005. 18th world congress of neurology.2005 Sydney, Australia.
- [6] WWW.Medicine.uiowa.edu/igec/tools/cognitive/MMSE.pdf
- [7] <http://www.realage.com/agingcenter/articles.aspx?aid=10403>.
- [8] <http://www.fupa.com/play/Puzzles-free-games/picture-find.html>.
- [9] <file://localhost/E:/online%20test/Short%20Term%20Memory2.mht>
- [10] <http://www.mathsisfun.com/games/memory/index.html>.
- [11] <E:/onlinetest/play image Disorder Willa Holland a free online game on Kongregate.hmt>
- [12] Sergio Domizio et al. *Clin Invest Med.* 2008; 31(1): E30-E40.
- [13] Florindo Stella, Jayme Antunes Maciel. *Arq Neuropsiquiatr* 2004;64 (4):983-7.