

EFFECT OF SEIZURE CONTROL ON IMPROVEMENT OF COGNITIVE FUNCTIONS IN EPILEPTIC PATIENTS

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SUMMARY

A group of fifty epileptic patients were tested with neuropsychological tools for cognitive functions like memory, intelligence, visuomotor coordination, spatial perception and body schema perception. Patients were on carbamazepine and were tested after three months. Seizure improvement was shown to have different effects on different cognitive functions. Memory and intellectual deficits improved, while no difference was observed in visuomotor coordination, spatial and personal perception.

INTRODUCTION

Disturbances in cognitive functions among epileptic patients have been found in a number of studies. Klove and Matthews (1966) and Virmani et al (1973) reported significantly lower IQs for epileptics whose fits were not controlled, in comparison to normal subjects. Poor memory scores have been reported for epileptic patients in studies conducted by Agnihotri et al (1972) and Loiseau et al (1980). Several studies using the Bender Gestalt Test have demonstrated poorer performance among epileptics than controls (Gupta et al, 1971; Virmani et al, 1973).

The control of seizures was found to be associated with an improvement of some cognitive functions. Virmani et al (1973) found significant improvement in Performance intelligence (PIQ), Verbal intelligence (VIQ) and Full scale intelligence (FSIQ) in patients whose fits were controlled for one year, as compared to normal subjects. The present study was designed to test the validity of previous studies and to address the issue whether cognitive functions improved in epileptics whose fits were controlled. Tests which have been indigenously developed were utilized in this study and carbamazepine was used as the antiepileptic drug.

MATERIALS AND METHODS

Fifty idiopathic epileptics having partial (simple or complex) and generalized (primary or secondarily generalized) fits were included. Patients were drawn from the Outpatient Departments of Neurology, Neurosurgery and Psychiatry, Institute of Medical Sciences, Banaras Hindu University. The patients were between 20-40 years; they had 8 years of schooling and both male and female patients were included. Mentally retarded patients and those patients having obvious brain damage on neuroradiological tests were excluded from the study. All patients were drug free for at least 6 months at the time of first contact; in addition, they were not on phenobarbitone previously and they had at least three fits in the preceding six months.

In another investigation Nainian et al, (manuscript in preparation), the performance of 50 epileptic patients with partial and generalized fits were compared to 50 normal age, sex and education matched controls on memory, intelligence and perception, in which patients had sig-

nificantly lower scores on all the functions measured.

Neuropsychological tests: The PGI-Memory Scale (Pershad, 1977), was utilized to test memory. Revised Bhatia's Short Battery of Performance Tests of Intelligence (Verma et al, 1988) was used to measure performance intelligence and Verbal Adult Intelligence Scale (Pershad & Verma, 1988) to measure verbal intelligence. Bender Visual Motor Gestalt (BVMG) and Nahor-Benson Test (NBT) were employed to measure visuomotor coordination and spatial perception. The Draw a Person Test (DAP) was used to assess body schema perception of the patients.

PROCEDURE

On the first contact, epileptic patients were administered the aforesaid tools (pre-condition). There was a minimum period of five days between neuropsychological testing and the last epileptic fit. Patients were treated with Carbamazepine only, the usual daily dosage ranged from 400 to 600 mg. After a follow up of three months, out of 68 patients who followed up 50 patients who were fit free for at least 3 months were reassessed on the same tools (post-condition).

RESULTS

Diagnostic break down of the study group showed that 24 of the patients had generalized fits (primary or secondarily generalized) and 26 patients had partial fits (simple or complex partial). Twenty nine patients had a duration of illness for less than five years, eleven between 5 to 10 years and the remaining ten patients had the illness for more than 10 years.

Data on memory (MQ), Performance intelligence (PIQ), Verbal intelligence (VIQ), Full scale intelligence (FSIQ), BVMG and NBT performance were statistically analyzed applying t tests. Means, standard deviations and t ratios of the raw scores on these six neuropsychological variables are given in Table 1. Epileptic patients as a group showed significant improvement on MQ, PIQ, VIQ, and FSIQ (p) in post-condition compared to pre-condition. However, statistically significant difference was observed on BVMG and NBT performance between pre and post-conditions.

The human figures drawn in DAP test were evaluated along five dimensions: abnormal contact features, disproportionate body parts, shading, distortion, and abnor-

Table 1
Means, Standard deviations and 't' ratios of raw scores on six neuropsychological variables for epileptics in pre and post-conditions (n=50).

Variables	Pre-condition		Post-condition		t (df=49)	Sig
	Mean	SD	Mean	SD		
MQ	76.90	9.44	85.24	5.92	10.12	**
PIQ	90.88	14.63	98.40	13.47	8.33	**
VIQ	99.58	9.09	106.42	11.04	9.56	**
FSIQ	95.36	10.43	102.52	11.03	11.48	**
BVMG	5.56	3.17	4.56	3.20	1.79	NS
NBT	1.82	1.09	1.82	1.22	0.83	NS

Table 2
Data on DAP performance for epileptics in pre and post conditions (n=50).

Characteristics	Pre-condition		Post-condition		CR (df=49)	Sig
	No. of cases	%	No. of cases	%		
Abnormal contact feature	31	62	27	54	1.27	NS
Disproportionate body parts	27	54	25	50	1.00	NS
Shading	9	18	8	16	0.44	NS
Abnormal size of the figure	15	30	22	44	2.33	*
Distortion of the figure	28	56	30	60	0.70	NS

* $p < 0.05$; ** $p < 0.01$; NS = Non Significant

mal size of the figure, and percentages for each dimension in pre and post-conditions were calculated. Analysis of pre and post-conditions by computing the critical ratios (Table 2) revealed that epileptic patients made no significant improvement in their figure drawings in post-condition as compared to the pre-condition, and in fact, showed even more deterioration on abnormal size of the figure in post-condition.

DISCUSSION

Control of seizures was found to be associated with improvement of some of the cognitive functions in epileptics (Virmani et al, 1973; Rodin et al, 1986). In the present study, a group of idiopathic epileptics who had shown significantly poor performance on cognitive functions as compared to normal subjects were tested for memory, intelligence, visuomotor coordination spatial perception and personal perception in pre and post-conditions.

Patients showed a significantly better performance on MQ in the post-condition, suggesting an improvement of memory function. This is in contrast to earlier findings reported by Virmani et al (1973), in which the authors used Diphenyl Hydantoin as the antiepileptic drug. This contradiction in findings therefore, may be attributed to the

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different antiepileptics used in the two studies.

On PIQ, VIQ and FSIQ patients showed significant improvement in post-condition, which suggest that intellectual functions improve after patients become seizure free. This finding supports observations reported earlier (Virmani et al, 1973). On BVMG and NBT performance, no reliable differences were observed between scores of pre and post-conditions. This finding suggests that deficits of visuomotor coordination and spatial perception do not improve even three months after patients become seizure free. The present finding is in accordance with earlier observations reported by Virmani et al (1973).

Data on DAP performance revealed that not only did the patients not improve in the post-condition, but they showed even more deterioration on particular dimensions such as an abnormal size of the figure. Such an observation indicates that control of seizures do not improve deficits observed in patients' self perception.

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