A STUDY OF USEFULNESS OF PSYCHOMETRIC TESTS IN DIAGNOSIS OF MINIMAL HEPATIC ENCEPHALOPATHY IN PATIENTS WITH CIRRHOSIS OF LIVER

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ABSTRACT

BACKGROUND

Hepatic encephalopathy (HE) is a potentially reversible, metabolically caused disturbance of central nervous system function that occurs in patients with acute or chronic liver disease. It encompasses a board spectrum of neurological symptoms of varying severity and is classified according to clinical symptoms. Minimal hepatic encephalopathy (MHE), previously known as subclinical or latent hepatic encephalopathy, is at the beginning of this spectrum. MHE has a high prevalence among patients with liver cirrhosis (22% to 74%).[1] It is defined as HE without symptoms on clinical/neurological examination, but with deficits in some cognitive areas that can only be measured by neuropsychometric testing and critical flicker frequency test. The areas with impairments are attention, visuospatial perception, speed of information processing, especially in the psychomotor area, fine motor skills, and short-term memory leading to impaired quality of life and ability to work associated with driving errors, accidents and further deterioration into overt encephalopathy and thereby with increased mortality. In our study, we study the effectiveness of Psychometric tests and Critical flicker frequency test in detecting minimal hepatic encephalopathy earlier in patients with cirrhosis.[1]

MATERIALS AND METHODS

This study has been carried out at the General Medicine OP and wards, Department of MGE OP and wards at Govt. Stanley Hospital, Chennai.

Study Period- Six months (From June 2013 to November 2013).

Study Design- This is a Prospective Observational Study.

CONCLUSION

Our study demonstrated the occurrence of Minimal Hepatic Encephalopathy (MHE) in patients with Cirrhosis irrespective of the aetiology even in the presence of stable clinical condition. Both Critical Flicker Frequency (CFF) and Psychometric tests have been found out to be effective in detecting MHE. Psychometric tests have subjective variations due to their age factor, differences in education while CFF Test has no such limitations and more of objective in nature not requiring any educational qualification for undergoing and interpretation of the light stimulus and is reproducible. The detection of MHE in more numbers in our study may be due to higher number of patients with higher classes of Child-Pugh classification. The presence of majority of the patients with Hepatitis B infection is due to our place of study being a tertiary care and a prestigious institute of Gastroenterology.

Hence, we would like to recommend the utilisation of Critical Flicker Frequency (CFF) Test as an Outpatient Department based screening procedure and also for the monitoring of patients with cirrhosis yet with a stable clinical condition so as to detect MHE earlier and promptly institute the therapy to avoid the complications.

KEYWORDS

Hepatic Encephalopathy, Cirrhosis, Psychometric Tests.

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INTRODUCTION

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The areas with impairments are attention, visuospatial perception, speed of information processing, especially in the psychomotor area, fine motor skills, and short-term memory leading to impaired quality of life and ability to work

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Ethical Committee Approval

The ethical committee approval was obtained for this study.

PATIENT SELECTION

Inclusion Criteria

1. Age more than 18 years and below 70 years.
2. All patients who have been diagnosed as cirrhosis of the liver and detected by clinical, serological, biochemical, assessments and USG.

Exclusion Criteria

1. Patients aged below 18 years and above 70 years.
2. Patients with overt hepatic encephalopathy had variceal bleed within 6 weeks.
3. Patients diagnosed with Hepatocellular Carcinoma.
4. Patients who had undergone TIPS or shunt surgery.
5. Patients who had taken alcohol in last 6 weeks.
6. Known Patients with cognitive impairment disorders as Alzheimer's disease, Parkinsonism.
7. Patients who are already taking sedatives, antidepressants.
8. Patients with impairment of vision.

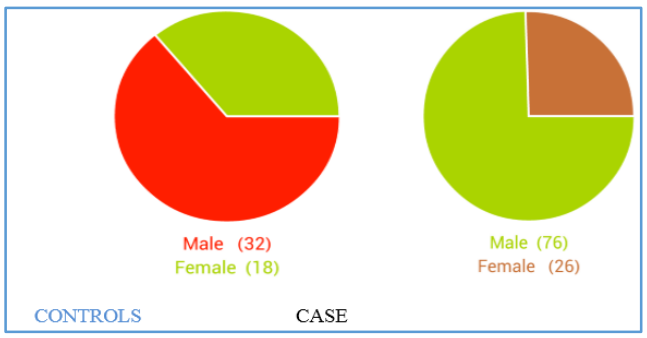
METHODOLOGY

100 patients who have been diagnosed with cirrhosis based on clinical, biochemical, serological and ultrasonogram visiting in Medicine OP, MGE OP and admitted in Medical wards and MGE wards and 50 normal people as control group from June 2013 to November 2013 are included in the study. Patients were subjected to symptom analysis, clinical examination, laboratory investigations, psychometric tests and critical flicker frequency test to establish the current degree of encephalopathy. The final analysis was made at the end of the study to achieve the aforementioned goal.

DISCUSSION

This study includes 150 patients with 100 people as proven cases of cirrhosis and 50 people as controls for the psychometric tests. All the patients under the study were found to have no neurological disorder or psychiatric illness.

Sex	Cases	Percentage	Controls	Percentage
Male	76	76%	32	64%
Female	24	24%	18	36%
Total	**100**		**50**	



	Group	N	Mean	Std. Deviation
Age in years	Control	50	40.38	11.820
	Study	100	41.03	12.333

There were 76 males and 24 females in the study group. There were 32 males and 18 females in the control group. In both the groups, the predominance of males is seen.

Mean age of presentation is 40 years with the youngest being 19 years and oldest 69 years. The mean age of study group is 41 years and of controls is 40 years.

PSYCHOMETRIC TESTS

	Group	N	Mean	Std. Deviation
NCT-A	Control	50	57.38	9.243
	Study	100	85.81	31.746
NCT-B	Control	50	152.34	19.448
	Study	100	224.07	55.332
DST	Control	50	194.46	34.929
	Study	100	270.38	49.218
LTT	Control	50	575.60	38.255
	Study	100	662.62	62.555
SDT	Control	50	207.40	96.533
	Study	100	271.28	76.997
CFF (Hz)	Control	50	47.882	4.6541
	Study	100	36.866	3.7761
CFF(SD)	Control	50	1.5770	.74642
	Study	100	1.2390	.70188

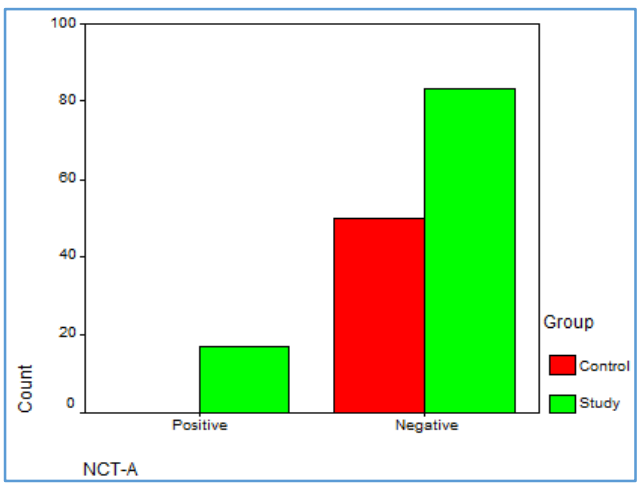
There exists significant difference in the performance of all the Psychometric tests as indicated by the values of median and standard deviation when compared between the study and the control groups (p=0.000).

NCT-A * Group

			Group		Total
			Control	Study	
NCT-A	+Ve	Count	0	17	17
		% within NCT-A	0%	100.0%	100.0%
		% within Group	0%	17.0%	11.3%
	-Ve	Count	50	83	133
		% within NCT-A	37.6%	62.4%	100.0%

		% within Group	100.0%	83.0%	88.7%
Total		Count	50	100	150
		% within NCT-A	33.3%	66.7%	100.0%
		% within Group	100.0%	100.0%	100.0%

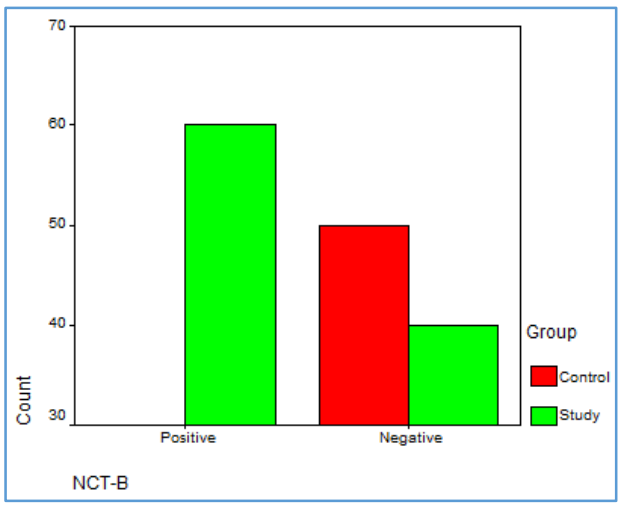
Number Connection Test –A was positive in only study group with no positivity at all in the control group.



NCT-A Test turned out to be positive in only study group.

			Group		Total
			Control	Study	
NCT-B	+Ve	Count	0	60	60
		% within NCT-B	.0%	100.0%	100.0%
		% within Group	.0%	60.0%	40.0%
	-Ve	Count	50	40	90
		% within NCT-B	55.6%	44.4%	100.0%
		% within Group	100.0%	40.0%	60.0%
Total		Count	50	100	150
		% within NCT-B	33.3%	66.7%	100.0%
		% within Group	100.0%	100.0%	100.0%

Number Connection Test –B is positive in 60 patients in the study group only.

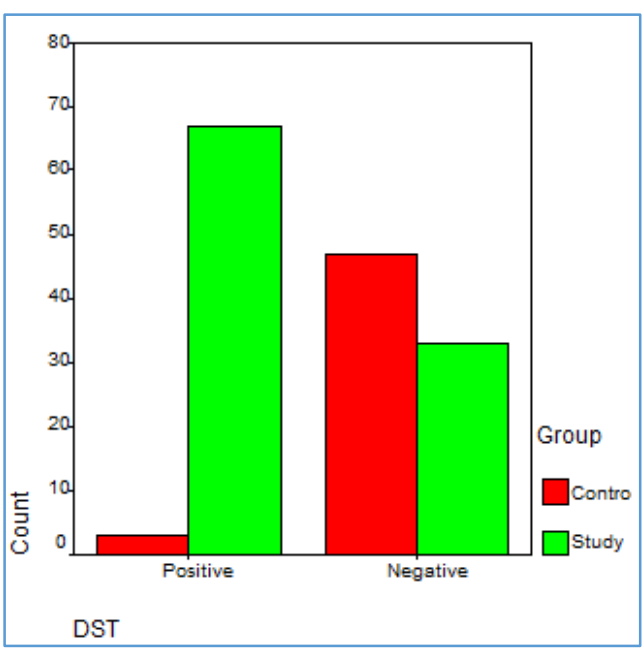


NCT –B was positivity in the study group only.

DIGIT SYMBOL TEST

			Group		Total
			Control	Study	
DST	+Ve	Count	3	67	70
		% within DST	4.3%	95.7%	100.0%
		% within Group	6.0%	67.0%	46.7%
	-Ve	Count	47	33	80
		% within DST	58.8%	41.3%	100.0%
		% within Group	94.0%	33.0%	53.3%
Total		Count	50	100	150
		% within DST	33.3%	66.7%	100.0%
		% within Group	100.0%	100.0%	100.0%

There were totally 70 patients who showed positivity for Digit Symbol Test among which 67 people (95.7%) were from the study group with the remaining 3 people (4.3%) from the control group.

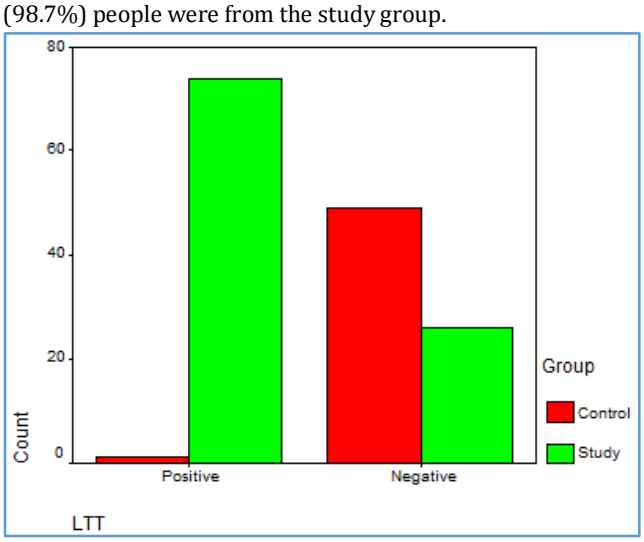


Predominantly, there were more positive people from the study group.

LINE TRACING TEST (LTT)

			Group		Total
			Control	Study	
LTT	+Ve	Count	1	74	75
		% within LTT	1.3%	98.7%	100.0%
		% within Group	2.0%	74.0%	50.0%
	-Ve	Count	49	26	75
		% within LTT	65.3%	34.7%	100.0%
		% within Group	98.0%	26.0%	50.0%
Total		Count	50	100	150
		% within LTT	33.3%	66.7%	100.0%
		% within Group	100.0%	100.0%	100.0%

Totally, 75 patients were positive for LTT out of which 74 (98.7%) people were from the study group.



Almost, Line tracing test was positive in the study group leaving a fraction of positivity to the control group.

SERIAL DOTTING TEST (SDT)

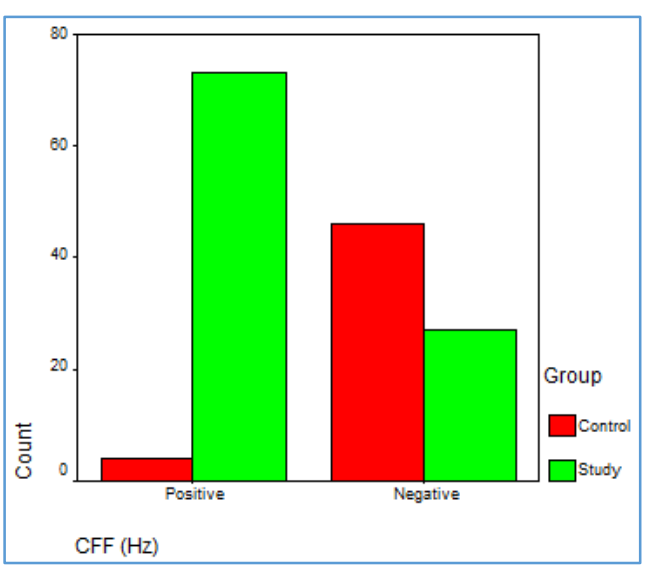
			Group		Total
			Control	Study	
SDT	+Ve	Count	3	70	73
		% within LTT	4.1%	95.9%	100.0%
		% within Group	6.0%	64.0%	48.7%
	-Ve	Count	47	30	77
		% within LTT	61.1%	38.9%	100.0%
		% within Group	94.0%	30%	51.3%
Total		Count	50	100	150
		% within LTT	33.3%	66.7%	100.0%
		% within Group	100.0%	100.0%	100.0%

There were totally 73 people who showed positivity for Serial Dotting Test out of which 70 people (95.9%) were from the study group while the remaining 3 people (4.1%) were from the control group.

CRITICAL FLICKER FREQUENCY (CFF)

			Group		Total
			Control	Study	
CFF (Hz)	Positive (<39 Hz)	Count	4	73	77
		% within CFF (Hz)	5.2%	94.8%	100.0%
		% within Group	8.0%	73.0%	51.3%
	Negative (>39 Hz)	Count	46	27	73
		% within CFF (Hz)	63.0%	37.0%	100.0%
		% within Group	92.0%	27.0%	48.7%
Total		Count	50	100	150
		% within CFF (Hz)	33.3%	66.7%	100.0%
		% within Group	100.0%	100.0%	100.0%

There were 73 patients (94.8%) who turned out to be positive among the study group, and 4 patients (5.2%) from the control group were positive in the study.



Flicker Frequency Test (p value =0).

Critical Flicker Frequency Test was more positive in the study group than the control group. Only a few positives were noted among the control group.

SUMMARY

In our study, 100 patients who have been diagnosed and proven as a case of cirrhosis were included under the study

group and 50 other people were included as control group without any evidence of liver disease. Before the study was commenced, all the people in both groups were clinically examined and were ruled out of any neuropsychological abnormalities. We utilised the psychometric tests in the study group and compared with the age, sex and education wise matched. In addition, critical flicker frequency test was carried out in both the study groups and the results were compared for further analysis.[2]

In our study, there was a preponderance of males in both the study groups with 76 males in the study group comprising 76% and 32 males in the control group as 64% of the members in their groups.

Mean age of presentation is 40 years with the youngest being 19 years and oldest as 69 years. The mean age of the study group is 41 years while that of the controls is 40 years.

Performances of the psychometric tests among the study group and the control group yielded significant results among the study group (p=0.000).

Critical Flicker Frequency Test was more positive in the study group than the control group and was found to be statistically significant values obtained as 0.000 indicating the higher significance when compared with the controls. Both the psychometric and critical flicker frequency tests were useful in detecting cases of minimal hepatic encephalopathy. Critical flicker frequency test was found to be more positive among the study group with 73% than the control group and hence the ability to detect the cases of minimal hepatic encephalopathy than the psychometric test.[3]

CONCLUSION

Our study demonstrated the occurrence of Minimal Hepatic Encephalopathy (MHE) in patients with Cirrhosis irrespective of the aetiology even in the presence of stable clinical condition. Both Critical Flicker Frequency (CFF) and Psychometric tests have been found out to be effective in detecting MHE. Psychometric tests have subjective variations due to their age factor, differences in education while CFF Test has no such limitations and more of objective in nature not requiring any educational qualification for undergoing and interpretation of the light stimulus and is reproducible .The detection of MHE in more numbers in our study may be due to higher number of patients with higher classes of Child-Pugh classification. The presence of majority of the patients with Hepatitis B infection is due to our place of study being a tertiary care and a prestigious institute of Gastroenterology.[4]

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