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STUDY OF MINIMAL HEPATIC ENCEPHALOPATHY IN PATIENTS OF CHRONIC LIVER DISEASE

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Abstract

Introduction: Chronic liver disease has a significant disease burden which contributes to both long term mortality and morbidity in patients. This cross-sectional observational study entitled "STUDY OF MINIMAL HEPATIC ENCEPHALOPATHY IN PATIENTS OF CHRONIC LIVER DISEASE" was conducted after clearance from board of studies and ethical committee in Department of General Medicine, School of Medical Sciences and Research, Sharda University, Greater Noida. **Materials and Methods:** The study population comprised of 52 patients with CLD. A detailed history, complete general physical examination. Routine and appropriate investigations. All patients enrolled in study underwent psychometric testing. The standardized test battery included NCT-A, NCT-B, the line trace test (LTT), the serial-dotting test (SDT) and DST. MELD and CTP were calculated. **Results:** MHE was found among 19 (36.5%) subjects. Among 19 CLD patients with MHE only 1 (5.26%) patient belonged to CTP class A, 13 (68.42%) patients belonged to CTP class B and 5 (26.31% patient belonged to CTP class C. Among 19 CLD patients with MHE, patients with MHE had a MELD score of less than 10 and 11-18. There was a significant positive correlation of CTP and MELD score with NCT A, NCT B, SDT and DST showing a linear positive association i.e., CLD patients with higher CTP and MELD score took more time to complete these psychometric tests. **Conclusions:** MHE is frequent in patients with CLD, manifested even in patients with child Pugh class A CLD. Timely diagnosis and intervention in a patient with MHE can help to prevent development of overt HE and also improve quality of life. Psychometric tests are simple, bed-side test which can be used to diagnose MHE. CTP score, MELD score, SGPT and SGOT can be used to predict MHE or identify patients at higher risk of developing HE.

Keywords: Liver Disease, Hepatic Encephalopathy, MHE, CTP, MELD, Psychometric Testing.

INTRODUCTION

Chronic liver disease presents a major problem worldwide. It has a significant disease burden which contributes to both long term mortality and morbidity in patients.[1] Persistent insult to the hepatocytes over a long period may lead to the end stage of chronic liver disease termed as cirrhosis of liver. Alcohol, and infection with Hepatitis B and C are the leading causes of liver cirrhosis worldwide. Patients with liver cirrhosis usually develop complications like ascites, esophageal variceal hemorrhage, hepatorenal syndrome and hepatic encephalopathy (HE).[2,3]

HE is a fairly common complication of liver cirrhosis with about 70% patient of CLD presenting with it. It may be a major contributing factor in mortality in up to 30% patients of CLD.[4]

Patients with liver disease develop HE due to portosystemic shunting and the effects of the portal blood, which contains toxins of intestinal origin, on the CNS. HE is

reversible which suggests a lack of persistent structural lesion in brain. The symptoms may vary from subclinical, for example subtle memory or attention deficit to overt like deep coma.[5] Minimal HE which is also known as subclinical of latent HE is the least symptomatic form of HE. It's characterized by presence of neuropsychiatric defects which are not detected during routine clinical/ neurological examination.[6] However, these abnormalities may be detected on specialized neuropsychiatric/ neurophysiological testing. Impairment in attention, visuospatial perception, speed of information processing, especially in the psychomotor area, fine motor skills and short-term memory are the usual finding in a patient with MHE. Various studies have pegged the prevalence of MHE between 22% to 74 % in patients with cirrhosis of liver. However due to lack of uniform diagnostic criteria and lack of evident symptoms MHE remains undiagnosed/ underdiagnosed.[7] As per current criteria MHE is diagnosed when there is impairment in at least 2 neuro-psychometric tests that is two SD below age and education matched healthy controls.[8]

Due to the fact that MHE remains underdiagnosed the patients with MHE have a markedly impaired quality of life and ability to work. Due to impaired attention, information processing and psychomotor skills these patients are unable to perform basic activities like driving a car, planning a trip etc.[9] MHE is also associated with increased risk of developing overt HE and overall mortality. Treatment with Lactulose and Rifaximin Improves quality of life in patients with MHE.[10,11]

Due to the simplicity of testing and treatment involved and the immense quality of life improvement it becomes important to screen all the patients of CLD for MHE. This can be done by doing simple albeit time consuming psychometric tests.

The objective of this research is to study prevalence of MHE using psychometric tests in patients with CLD so as to prevent its progression to overt hepatic encephalopathy by giving proper treatment. We also aim to establish the correlation between MHE in patients of CLD with disease severity using scores like Child-Turcotte-Pugh score and MELD score.

MATERIALS AND METHODS

This cross-sectional observational study was conducted, after clearance from board of studies and ethical committee, in the Department of Internal Medicine, School of Medical Science and Research, Sharda University, Greater Noida during a period of 2019 to 2021

Sample size

The study population was 50 subjects.

Calculated with 80% power and 5% significance level.

Sampling method

It's a consecutive non-random sampling

Study design

Cross-sectional observational study

Study population

The subjects were taken from patients with Chronic Liver Disease presenting to OPD or admitted as IPD in the department of medicine, Sharda Hospital, Greater Noida

Inclusion and Exclusion Criteria

The study subjects were chosen according to the inclusion and exclusion criteria:

Inclusion Criteria

1. Clinical criteria: H/O jaundice for more than 6 months with clinical signs of Liver failure
2. Biochemical criteria: Altered LFT's with point 3
3. Radiology criteria: Ultrasound or CT abdomen showing shrunken or nodular liver with features of portal hypertension
4. Biopsy proven cases of CLD

Exclusion Criteria

1. Presence of overt HE or history of overt HE
2. Previous TIPS or shunt surgery
3. Significant comorbidity such as heart, respiratory or renal failure
4. History of any neurological disease like Alzheimer's disease, Parkinson's disease or other non-hepatic metabolic encephalopathy.
5. Patients on psychiatric medications
6. Patients with active alcohol consumption

Study procedure

After approval from the IEC all patients were selected as per inclusion and exclusion criteria. A detailed history, complete general physical examination. Routine and appropriate investigations and psychometric tests were done for all patients.

Psychometric testing

All patients enrolled in study underwent psychometric testing as recommended by the final report of the working party at the 11th world congress of gastroenterology 1998.[8] The working party recommends that the diagnosis of MHE requires a normal mental status examination and impairment in the performance of at least two of the following tests: number connection test A (NCT-A), number connection test B (NCT-B), block design test (BDT) and digit symbol test (DST). The working party also recommended the use of Portosystemic encephalopathy (PSE) syndrome test and psychometric hepatic encephalopathy score (PHES). PSE syndrome test is a standardized test battery including NCT-A, NCT-B, the line trace test (LTT), the serial-dotting test (SDT) and DST. NCT-A and NCT-B and figure connection test (FCT-A and FCT-B), if illiterate. In the NCT-A, which measures cognitive motor abilities, patients connect numbers from 1 to 25 printed on paper as quickly as possible. In NCT-B, letters are also included and the patients connect alternating numbers and alphabets (1-A, 2-B, 3-C…. etc.). In principle the FCT is similar to NCT except the numbers are replaced by figures. Each circle has one to five motifs thus giving the required 25 figures. In FCT-A all circles with the same motif were connected in order of increasing numbers

of motifs and in sequence specified in the chart; while in FCT-B all circles with one motif were connected in the sequence specified in the chart.

In DST, patients were given a list of digits from 1 to 9 associated with symbols and was asked to fill the blanks with symbols that correspond to each number. An initial demonstration was performed to familiarize the subjects with the test. In serial dotting test 10 rows of 10 circles each was present, patient was timed on how quickly he/ she can draw a dot in the center of each circle.

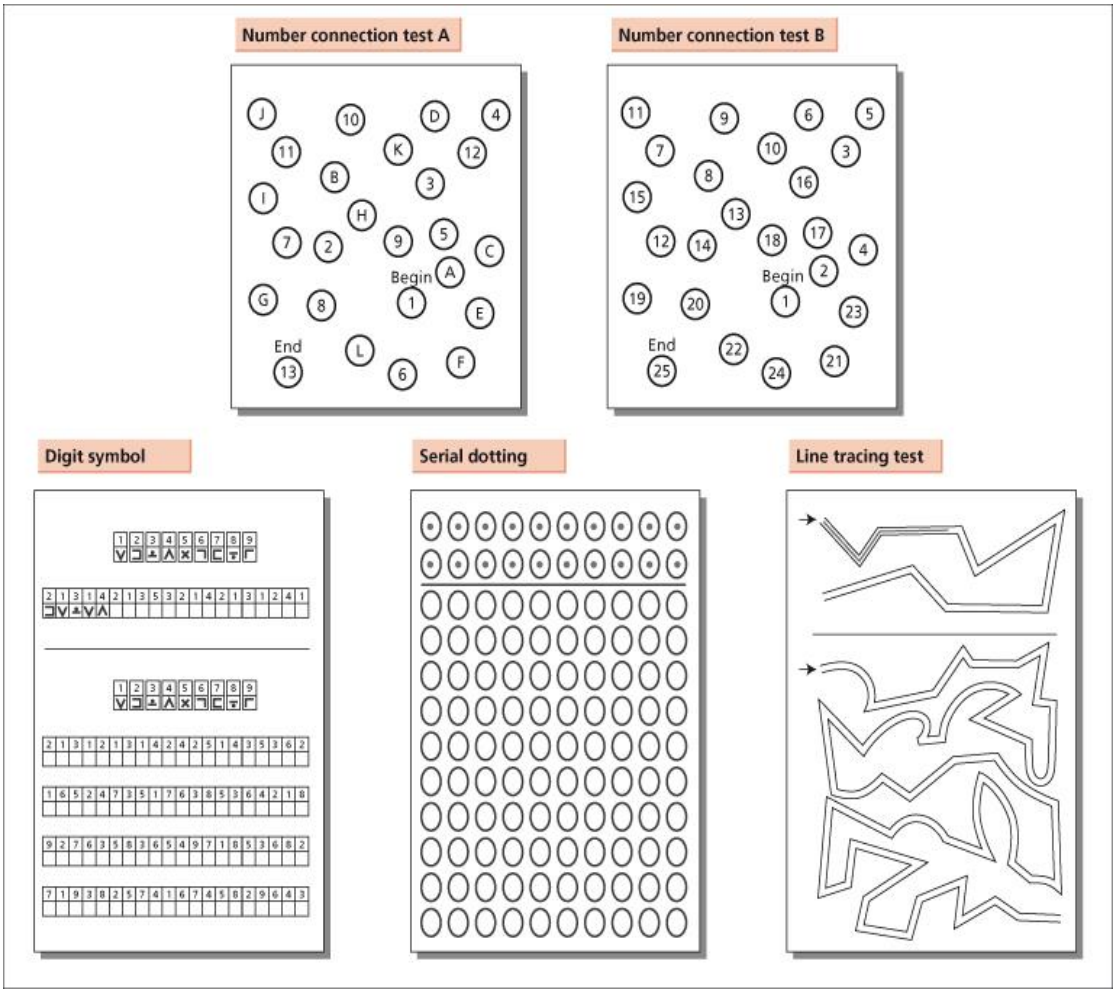

Figure 1: the Neuropsychiatric tests used to detect MHE. NCT-A, NCT-B, DST, SDT and LTT

Blood tests and biochemical examination

Blood sample was collected and relevant hematological and biochemical tests, such as Complete blood Count, Liver Function test, Renal Function Tests, Prothrombin time were done.

Ultrasound

All patients underwent USG after overnight fasting and following details were recorded: maximum vertical span of liver, spleen size (length of its longest axis), diameter of portal and splenic veins, presence of Porto-systemic collaterals and presence of ascites.

Upper GI endoscopy to rule out esophageal varices/ portal gastropathy etc.

Calculation of Child-Turcotte-Pugh score

The score employs five clinical and biochemical parameters. Each parameter is scored between 1 and 3.[12]

Parameter	Units	1 point	2 point	3 point
Serum Bilirubin	umol/L mg/dL	<34 <2.0	34-51 2.1-2.9	>51 >3.0
Serum albumin	g/dL	>3.5	3.0-3.5	<3.0
Prothrombin time	Seconds prolonged INR	<4 <1.7	4-6 1.7-2.3	>6 >2.3
Ascites		None	Easily controlled	Poorly controlled

INR- International normalized ratio

CLD is classified into CTP class A to C, employing the added scores from above

Total points	CTP class
5-6	A
7-9	B
10-15	C

MELD score was calculated using the formula

MELD = 0.957 × ln(Cr) + 0.378 × ln(bilirubin) + 1.120 × ln(INR) + 0.643. 13

Data collection method

- Patients detailed history was taken along with thorough physical examination and relevant investigations were done.
- Investigations included CBC, LFT, KFT, RBS USG whole abdomen
- CTP score and MELD score were calculated.
- Neuropsychiatric tests were performed

Statistical analysis

The data was entered into the Microsoft excel and statistical analysis was performed by statistical software SPSS version 21.0. The quantitative (numerical variables) were present in the form of mean and SD and the qualitative (categorial variables) were present in the form of frequency and percentage.

The student t test was used for comparing means values between the 2 groups whereas chi-square test was applied for comparing frequency. The p-value of less than 0.05 was considered significant.

RESULTS

Table 1: Distribution of study population according to age

Age (Years)	Frequency	Percentage
28-40	13	25%
41-60	29	55.8%
Above 60 years	10	19.2%
Mean ± SD	50.42 ± 11.49	

The mean age of the study population was 50.42 ± 11.49 years with a majority belonging to 41-60 years (55.8 %) age group.

Table 2: Distribution of study population according to gender

Gender	Frequency	Percentage
Male	42	80.8%
Female	10	19.2%
Total	52	100%

The study population consisted of 42 (80.8%) males and 10 (19.2%) females.

Table 3: Distribution of study population according to severity of ascites

Ascites Severity	Frequency	Percentage
Absent	3	5.8%
Mild	28	53.8%
Moderate	19	36.5%
Massive	2	3.8%
Total	52	100%

Ascites was present in 94.2% subjects with 53.8% having mild, 36.5% having moderate and 3.8% having massive ascites.

Table 4: Distribution of study population according to etiology

Etiology	Frequency	Percentage
Hepatitis B	9	17.3%
Hepatitis C	13	25%
Ethanol	33	63.5%

Majority of the patients (63.5%) had ethanol related CLD while the rest were due to chronic hepatitis B and C.

Table 5: Distribution of study population according to CTP class

CTP Class	Frequency	Percentage
A	3	5.8%
B	42	80.8%
C	7	13.5%
Total	52	100%

Majority of the study population was CTP class B (80.8%). CTP class C had 13.5% subjects while 5.8% were CTP class A.

Table 6: Distribution of study population according to MELD score

MELD Score	Frequency	Percentage
10 or less	16	30.8%
11-18	30	57.7%
19-24	4	7.7%
25 or higher	2	3.8%
Mean ± SD	13.1 ± 4.12	

In our study population a MELD score of 10 or less was found among 30.8%, 11-18 among 57.7%, 19-24 among 7.7% and 25 or higher among 3.8%.

Table 7: Distribution of study population according to presence or absence of MHE

MHE	Number	Percentage
Present	19	36.5%
Absent	33	63.5%

We found that 36.5% of our subjects had MHE.

Table 8: Correlation of MHE with age

MHE Status	Mean Age	SD	Number	p Value
Present	49.11	13.42	19	0.528
Absent	51.18	9.94	33	

The mean age in the MHE patients was 49.11 years (standard deviation of 13.42 years) while in patients without MHE the mean age was 51.18 years (±9.94 years) which was not statistically significant. (p=0.528) Hence MHE in CLD patients was not affected by age.

Table 9: Correlation of MHE with sex

MHE status	Male	Female	p Value
Present	16	3	0.9092
Absent	26	7	

Out of 19 patients with MHE 16 were males (84.21%) and 3 were females (15.79%). While of the 33 patients without MHE 26 were males (78.78%) and 7 were females (21.21%). We found no statistically significant difference between the two groups. (p=0.9092)

Table 10: Correlation of MHE with CTP score

CTP Class	MHE Present	MHE Absent	p Value
A	1	2	0.2335
B	13	29	
C	5	2	

Among 19 patients with MHE, only 1 (5.26%) patient belonged to CTP class A, 13 (68.42%) patients belonged to CTP B class and 5 (26.31%) patients belonged to CTP class C. Thus, mostly patients were from class B or C.

Among 33 patients without MHE, 2 (6.06%) belonged to CTP class A, 29 (87.88%) patients belonged to CTP class B and 2 (6.06%) patients belonged to CTP class C. Thus, mostly the patients were from CTP class B.

There was no statistically significant difference (p=0.2335) between CTP score and MHE presence in patients of CLD. But the prevalence of MHE was higher in patients with CTP class B or C disease.

Table 11: Correlation of MHE with MELD score

MELD Score	MHE Present	MHE Absent	p Value
≤10	8	8	0.291
11 to 18	7	23	
19 to 24	2	2	
≥25	2	0	

Among 19 CLD patients with MHE, 8 (42.1%) patients had MELD score of ≤10, 7 (36.84%) patients had MELD score of 11-18, 2 (10.52%) patients had MELD score of 19 to 24 and 2 (10.52%) patients had MELD score of ≥25.

Among 33 CLD patients without MHE, 8 (24.24%) patients had a MELD score of ≤10, 23 (69.69%) patients had a MELD score of 11-18, 2 (6.06%) patients had MELD score of 19 to 24 and none of the patients had MELD score of ≥25.

There was no statistically significant difference (p=0.291) between MELD score with presence of MHE in patients of CLD.

Tabel 12: Distribution of mean Total bilirubin, Total Protein, Albumin, SGOT, SGPT and ALP levels

Parameter	Minimum	Maximum	Mean	SD
Total Bilirubin	0.60	15.08	1.95	2.57
Total Protein	3.60	7.70	5.66	1.04
Albumin	1.90	4.40	2.94	0.66
SGOT	25.00	347.00	100.65	55.00
SGPT	32.00	335.00	77.50	48.02
ALP	57.00	390.00	136.29	53.69

Table 13: Distribution of mean values of different psychometric tests

Psychometric tests	Mean	SD	Minimum	Maximum
NCT A (seconds)	65.35	25.29	30.20	132.50
NCT B (seconds)	105.41	40.23	48.30	195.20
SDT (seconds)	115.21	39.40	61.20	191.30
DST (seconds)	116.68	37.06	69.70	181.30

The mean NCT A (seconds) was 65.35± 25.29, NCT B was 105.41± 40.23, SDT 115.21± 39.40 and DST was 116.68± 37.06.

Table 14: Correlation of CTP score with SGOT, SGPT and ALP

Parameters		CTP Score
SGOT	Pearson Correlation	0.504
	P- value	0.001
SGPT	Pearson correlation	0.441
	p - value	0.001
ALP	Pearson correlation	0.451
	P value	0.001

There was a significant positive correlation between CTP score and SGOT, SGPT and ALP showing a linear positive association.

Table 15: Correlation of CTP score with total bilirubin, total proteins and albumin

		CTP Score
T. Bilirubin	Pearson correlation	0.723
	P value	0.001
T. Protein	Pearson correlation	-0.401
	P value	0.003
Albumin	Pearson correlation	-0.553
	P value	0.001

There was a significantly positive correlation of CTP score with total bilirubin showing a linear positive association. There was a significantly negative correlation of CTP score with total protein and albumin levels showing a linear negative association.

Table 16: Correlation of CTP score with different psychometric tests

		CTP Score
NCT-A (seconds)	Pearson correlation	0.267
	p value	0.045
NCT-B (seconds)	Pearson correlation	0.248
	p value	0.049
SDT (seconds)	Pearson correlation	0.253
	p value	0.047
DST (seconds)	Pearson correlation	0.263
	p value	0.046

There was a significant positive correlation of CTP score with NCT-A, NCT-B, SDT and DST showing a linear positive association.

Table 17: Correlation of MELD score with SGOT, SGPT and ALP

		MELD Score
SGOT	Pearson correlation	0.370
	p value	0.007
SGPT	Pearson correlation	0.415
	p value	0.002
ALP	Pearson correlation	0.404
	p value	0.003

There was a significant positive correlation of MELD score with SGOT, SGPT and ALP showing a linear positive correlation.

Table 18: Correlation of MELD score with total bilirubin, total protein and Albumin

		MELD Score
Total Bilirubin	Pearson correlation	0.648
	p value	0.001
Total Protein	Pearson correlation	-0.141
	p value	0.319
Albumin	Pearson correlation	-0.253
	p value	0.047

There was significant positive correlation of MELD score with total bilirubin showing a linear positive association. There was significant negative correlation of MELD score with total albumin showing a linear negative association. The negative association between MELD score and total protein was not statistically significant.

Table 19: Correlation of MELD score with different psychometric tests

		MELD Score
NCT-A (sec)	Pearson correlation	0.230
	p value	0.048
NCT-B (sec)	Pearson correlation	0.236
	p value	0.047
SDT (sec)	Pearson correlation	0.216
	p value	0.047
DST (sec)	Pearson correlation	0.270
	p value	0.047

There was a significant positive correlation of MELD score with NCT-A, NCT-B, SDT and DST showing a linear positive association.

DISCUSSION

Chronic liver disease is characterized by gradual destruction of liver parenchyma leading to fibrosis. It is caused by a variety of different factors such as viral hepatitis, excessive alcoholism, genetic, autoimmune, NAFLD/NASH. It is one of the leading causes of morbidity and mortality in developed and developing parts of the world.[14]

Hepatic encephalopathy is an important neuropsychiatric complication of liver disease. The prevalence of MHE among CLD patients differ from one population to another as do the various risk factors/ etiology of CLD. The diagnosis of minimal HE is based on a careful neuropsychiatric evaluation.[15] The most established testing strategies for

MHE are: portosystemic encephalopathy syndrome test (PST), the critical flicker frequency test (CFF), the continuous reaction time test (CRT), the inhibitory control test (ICT) and the stroop test. However, these tests are time consuming and are not available everywhere. Hence simple psychometric tests are advised for bedside evaluation of MHE.

In present study, 52 patient of chronic liver disease were enrolled from OPD/IPD in department of medicine, Sharda hospital, Greater Noida, after taking informed consent. A detailed history, examination, routine and appropriate investigations and psychometric tests were done for all patients.

In our study, the mean age of the study population of chronic liver disease was 50.42± 11.49 years with majority belonging to 41-60 years (55.8%) age group. This was in concurrence with other similar studies carried out by Abedin et al.[15] and Quero et al.[16] In another study comprising of 179 subjects conducted by Groenweg et al.[17] the mean age 50 years.

The study population in our study consisted of 80.8% males and 19.2% females. There were 84.21% males and 15.79% females out of 19 CLD patients with MHE. While there were 78.79% males and 21.21% females out of 33 CLD patients without MHE. Thus, males were more affected irrespective of presence of MHE in CLD patients.

Our findings were similar to that reported by Abedin et al.15 found that the majority of the patients were males. In their study, males constituted about 88% and 86% in case and control group, respectively. Bamidele et al.[18] reported that more than three quarters of the patients studied were males (84.4%) with a female to male ration of 1:4.8. The male predominance in this study may be due to the fact that males are more exposed to risk factors predisposing to CLD such as alcohol intake, ingestion of herbal concoction, multiple sexual partners and sharing sharps. In addition, Yu et al.[19] demonstrated that the male sex hormone testosterone was significantly higher in HbsAg positive HCC when compared to controls.

In our study, ascites was present among 94.2% subjects with 53.8% having mild, 36.5% having moderate and 3.8% having massive ascites. In the study by Bawankule et al.[20], ascites was present among 66.15% subjects. In another study by, Jain et al.[21] it was found ascites was the commonest finding in 71% of the study population, followed by splenomegaly, pedal edema and upper gastrointestinal bleeding which were found in 63.3%, 61.4% and 31.1% of study population, respectively.

Etiological factors

In our study the etiologic factors were Alcohol related (63.5%), chronic Hepatitis C infection (25%) and Chronic Hepatitis B infection (7.3%).

In a similar study conducted by Arisar et al.[22], out of 133 patients, 88.6% had Hepatitis C and 7.33% had Hepatitis B. However, Bamidele et al.[18] in their study had patients who were predominantly suffering from chronic Hepatitis B related CLD (78%), which was different from our study. Jain et al.[21] also reported in their study that in a majority (70.1%) of the study subjects, alcohol consumption was the probable etiology for cirrhosis of liver followed by cryptogenic in 22.2%. In this study, 4.4% had both alcohol and Hepatitis B infections and only 2.9% were due to Hepatitis B infection alone.

Our findings, when compared with studies done in different countries as mentioned above, show that alcoholism is clearly the leading cause of cirrhosis of liver and hence

awareness among people towards that alcohol abstinence can significantly alter the incidence of cirrhosis. In the western world, alcoholism is the main cause of liver cirrhosis and there is a definite male preponderance to the extent of 77.33%, making it the fourth most common cause of death in males in the USA.[20]

Neuropsychological test

MHE is characterized by subtle deficits and psychomotor abnormalities that can only be elicited by specialized psychometric tests. Currently, psychomotor tests are commonly used for its diagnosis and critical flicker frequency (CFF) is considered an important new diagnostic tool for MHE diagnosis.[23] In present study, the mean NCT-A (sec) was 65.35± 25.29 (range= 30.2-132.5), NCT-B (sec) was 105.41± 40.23 (range= 48.3- 195.2), SDT (sec) was 115.21± 39.40 (range= 61.2- 191.3) and DST (sec) was 116.68± 37.06 (range= 69.7- 181.3).

There was significant positive correlation of CTP score and MELD score with NCT-A, NCT-B. SDT and DST showing a linear positive association. This shows correlation of impairment found in psychometric tests with increasing severity of liver disease assessed by CTP class.

Controversy exists in literature regarding the correlation between severity of liver disease and prevalence of MHE. Many studies have shown correlation of impairment found in psychometric and neurophysiological tests with increasing severity of liver disease assessed by CTP class, while others find no such correlation.[24-6]

MHE may affect multiple aspects of brain function such as perception, memory, attention, mental speed etc.[27] Neuropsychological tests are designed to recognize those with brain dysfunction. Normal cut off point of this paper pencil test obtained first from healthy control. There are available normal cut-off values for the German, Italian and Spanish population which are significantly different from each other.[28] So it is of utmost importance to set a normal cut off value of those psychometric tests before using it as tools for diagnosis of minimal hepatic encephalopathy in our context. In this study normal value of number connection test was up to 52 seconds, serial dotting test is up to 52 seconds and line tracing test is up to 84 seconds.[15]

As there is no consensus on the diagnosis of MHE, it will be worth recommending the use of neuro-psychometric tests specially NCT, SDT and DST in diagnosing MHE as they cover the cognitive aspects that are affected in MHE. They are also cheap, reproducible and accessible.

Prevalence of MHE

MHE impairs patients' daily functioning and quality of life. Patients with MHE have difficulties with attention, response inhibition and working memory, which are associated with driving impairment and high motor vehicle accident risk. Prevalence of MHE was found among 36.5% of our subjects. Our study coincided with findings by Sharma and Sharma,[29] who found that 41% of the patients in their study were having MHE with 35% patients in Child A, 36% with Child B and 56% with Child C disease.

However, our prevalence rate was much lesser than that encountered by Abedin et al.[15] in their study where they found that the prevalence of MHE in patients of CLD was 66%. In another study from Saudi Arabia conducted by Praveen et al.[30] which used sophisticated diagnostic tools such as a P300 auditory event potential and a

critical flicker frequency with psychometry. They found the prevalence of MHE to be 41% which was slightly higher than our findings.

This wide range of MHE prevalence may be because of difference in definition, lack of standardized diagnostic criteria, difference in diagnostic method, the clinic-pathological cop morbid spectrum and socio-demographic variables.

CTP score

In the current study, among the 19 CLD patients with MHE, 5.26% patients belonged to CTP class A, 68.42% patients belonged to CTP class B and 26.31% patients belonged to CTP class C. Among 33 CLD patients without MHE, 6.06% patients belonged to CTP class A, 87.88% patients belonged to CTP class B and 6.06% patients belonged to CTP class C.

We observed that most of the patients with MHE belonged to CTP class B and C and only a few (5.26%) were in class A. Thus, it can be postulated that the incidence of MHE increases with increasing CTP scores.

Similar findings were observed in the study conducted by Praveen et al.[30] in Saudi Arabia where 92 % of the patients with MHE had a CTP score of 7 or more i.e., class B or C.

Like many other factors advanced liver disease is also responsible for the increased prevalence of minimal hepatic encephalopathy. In a study conducted previously it was shown that the prevalence of minimal hepatic encephalopathy is less than 15% in CTP class A while its more than 50% in patients with CTP class B/C.[31]

Bamidele et al.[18] Reported that among patients with MHE, 82.1% were in Child-Pugh class B or C. in this study the occurrence of MHE increased with an increasing Child Pugh score.

MELD score

In our study we found that in our study population, of the 19 patients of CLD with MHE, 8 (42.1%) patients had MELD score of <10, 7 (36.84%) patient had a MELD score between 11-18, 2 (10.52%) patients had MELD score of 19-24 and 2 (10.52%) patient had a MELD score of more than 25. Thus mostly patient with MHE had a MELD score of less than 10 and between 11-18. In the present study, the mean MELD score was 13.1+- 4.12 (6-26) and mean CTP score was 8.17 +- 1.41 (6-13).

Arisar et al.[22] reported that the mean meld score of the patients in their study was 17.2 while the mean CTP was 9.65. Yoo et al.[32] found no difference in the MELD scores between those with and without EEG abnormalities (19.1 =-6.9 vs 15.4 +-5.7; P=NS) or between those with normal and abnormal neuropsychometric examinations results; while the study by Meyer et al.[33] concluded that MELD scores were significantly and positively correlated with results of neuropsychometric tests suggesting that increased disease severity is related to significantly slower performance.

Sharma and Sharma[34] reported that MHE was significanlty correlated with MELD scores (r=0.411). one of the important aspects of the MELD which is calculated from three biochemical variable (serum bilirubin, prothrombin time and creatinine) is that it has continuous variables and accounts for the spectrum of disease severity.

SUMMARY

This cross-sectional observational study entitled “STUDY OF MINIMAL HEPATIC ENCEPHALOPATHY IN PATIENTS OF CHRONIC LIVER DISEASE” was conducted after clearance from Board of studies and ethical committee in department of general medicine, school of medical sciences and research, Sharda university, Greater Noida.

The study population comprised of 52 patients with CLD of which 42 (80.8%) were males while 10 (19.2%) were females. The mean age of the study population was 50.42+- 11.49 years. Alcohol was the most common etiology for CLD. It was present among 33 (63.5%) subjects, Hepatitis B was present among 9 (17.3%) and Hepatitis C among 13 (25%). Ascites was present among 94.2% subjects with 53.8% having mild, 36.5% having moderate and 3.8% having massive ascites. MHE was found among 19 (36.5%) subjects. Among 19 CLD patients with MHE only 1 (5.26%) patient belonged to CTP class A, 13 (68.42%) patients belonged to CTP class B and 5 (26.31% patient belonged to CTP class C. thus majority of patients were from CTP class B or C. Among 19 CLD patients with MHE, 8 (42.1%) patients had MELD score of less than 10, 7 (36.84%) patients had MELD score of 11-18, 2 (10.52%) patients had MELD score of 19-24 and 2 (10.52%) patients had a MELD score of more than 25. Thus, mostly patients with MHE had a MELD score of less than 10 and 11-18.

There was a significant positive correlation of CTP score with NCT A, NCT b ADT and DST showing a linear positive association i.e., CLD patients with higher CTP score took more time to complete these psychometric tests. Thus, they had more chance of having MHE.

There was a significant positive correlation of MELD score with NCT A, NCT B, SDT and DST showing a linear positive correlation i.e., CLD patients with higher MELD score took more time to complete these psychometric tests. Thus, they had a higher chance of having MHE.

Thus, for the diagnosis of MHE, a standardized battery of tests which includes NCT A & B, SDT and DST is recommended.

CONCLUSION

MHE is frequent in patients with CLD, manifested even in patients with child Pugh class A. Every attention should be given to detect MHE in patients with CLD well before they develop overt HE. Many CLD patients coming to OPD could be suffering from MHE, their symptoms are usually missed and they are prone to develop overt HE. Patients with MHE have difficulties in attention, response inhibition and working memory, which are associated with driving impairment and an increased risk of motor vehicle accident.

So, psychometric tests are simple, bed-side test which can be used to diagnose MHE. CTP score, MELD score, SGPT and SGOT can be used to predict MHE or identify patients at higher risk of developing HE. We found that patients with CTP score more than 7, MELD score more than 10, raised SGPT and raised SGOT have a higher chance of developing MHE.

We concluded that all patients with CLD should be screened for MHE, so that early diagnosis and treatment of MHE can be done which would in turn help to prevent development of overt HE.

LIMITATIONS

The limitations in this study were that the sophisticated tools used in diagnosing MHE, as these were unavailable at the time of this study.

Liver biopsy could not be done to confirm histological diagnosis of the patients due to technical requirements and reluctance of patients towards such procedure.

A larger sample size would have provided more generalizable results.

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