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HYPONATREMIA IN PATIENTS WITH CIRRHOSIS-ORIGINAL ARTICLE

Medicine

Dr.Aher Sangeeta M.D, DHA Associate Professor ,Dept.of Medicine ,T.N.M.C

Dr.Ashok kumar M.D, A.D.LChief Health Director ,Jagjeevan Ram hospital

ABSTRACT

Hyponatremia is a common problem in patients with advanced cirrhosis and portal hypertension[1].The severity of the hyponatremia is related to the severity of the cirrhosis.It is characterized by excessive renal retention of water relative to sodium due to reduced solute-free water clearance[2]. The primary cause is increased release of arginine vasopressin. Hyponatremia is associated with increased mortality in cirrhotic patients, those with end-stage liver disease (ESLD) .Clinical evidence suggests that adding serum sodium to model for ESLD (MELD) scoring identifies patients in greatest need of liver transplantation by improving waiting list mortality prediction[3].

KEYWORDS

Hyponatremia, cirrhosis, MELD scoring.

1] Introduction :

Hyponatraemia is a common complication of advanced cirrhosis related to an impairment in the renal capacity for eliminating solute-free water, causing a retention of water that is disproportionate to the retention of sodium, thus leading to a reduction in serum sodium concentration and hypo-osmolality[4]. The main pathogenic factor responsible for hyponatraemia is a non-osmotic hypersecretion of arginine vasopressin (AVP) or antidiuretic hormone from the neurohypophysis, related to circulatory dysfunction. Hyponatraemia in cirrhosis is associated with increased morbidity and mortality. In recent years, hyponatremia has attracted interest as a possible prognostic factor for liver cirrhosis. To date, no Indian studies have been conducted to examine its prevalence or the concurrent presence of its complications. We conducted this study to examine the prevalence of hyponatremia and its complications with liver cirrhosis.

AIM AND OBJECTIVES:

Aim: To study the significance between the serum sodium and the severity of liver disease in cirrhotic patients.

Objectives:

1) To study prevalence of low sodium level in cases of cirrhosis admitted in general medicine ward.
2) To assess the severity of cirrhosis by using Child Pugh score.
3) To assess the significance between Child Pugh score and serum sodium level in those patients.

2] Materials and Method:

Study design: Retrospective Observational study.**Study duration:** FROM OCTOBER 2016 TO DECMBER 2016 .**Study Population:** Present study was undertaken on Patients satisfying the inclusion criteria was enrolled in the study.**Sample size:**50

2.1]Inclusion criteria:

1 Diagnosed cases & Newly diagnosed cases of liver cirrhosis with clinical signs and symptoms suggestive of cirrhosis along with biochemical and radiological reports who were admitted in general medicine ward from august 2015 to August 2016.
2) All adults both male and female with age greater than 18 years.

2.2]Exclusion criteria: The patients with

- hepatocellular carcinoma (HCC),
- exudative ascites,
- other causes hypovolemic and hypervolemic of hyponatraemia
- using diuretic within one month

2.3}Statistical analysis: Statistical analysis was performed using SAS. Statistical methods included the Chi-square test and ANOVA. A *p* value <0.05 was considered statistically significant

3] METHODOLOGY:

The cause of cirrhosis other than Alcoholic, Hepatitis B, Hepatitis C was classified as 'others'. Serum level of sodium < 130 meq/L was defined as hyponatremia. The reports of tests for serum electrolytes, serum creatinine, LFT, serum albumin, prothrombin time and viral marker were noted down in all patients. The severity of cirrhosis was assessed by Child-Pugh score. Present study was undertaken at tertiary care hospital in India. Diagnosis of cirrhosis was made by using clinical , biochemical and ultrasonography findings which were mentioned in medical records.

Serum sodium level was noted down at the time admission and thereafter till discharge or death of the patient. All the reports of other tests which are required for calculating child pugh score were taken into consideration including total bilirubin, serum albumin, prothrombin time, ascites.

4] Result :

In the present study, the most common age group amongst study population was 41 to 50 years (42%) followed by 51 to 60 years (38%) and more than 60 years (20%) with the mean age of 52.32 ± 6.07 years. There was higher number of male (92%) as compared to female (8%) amongst study population **Table no 1.**

Clinical features amongst study population: As seen in the above table, Jaundice (52%) was the most common clinical feature amongst study population followed by Edema Feet (42%) and Abdominal Distension. (23%) **Table no 2**

Table no 3 History of alcoholism amongst study population ;history of alcoholism was present in 38% of study population.

On clinical examination :Edema Feet and Icterus was present in 86% and 86% of study population on general examination findings .ascites and soft non tender LIVER was present in 56% and 44% of study population on abdomen examination.U.S.G showed , irregular and nodular liver surface was present in 26% and 74% of study population . Mild and moderate ascites was present in 36% and 56% of study population .

CNS EXAMINATION : most of the study population were drowsy with irrelevant speech (30%) followed by comatose (20%) and conscious, asterixis (12%) , conscious, oriented to time place person (12%) .

HbsAg was positive in 70% of study population. Anti HCV was positive in 12% of study population.most of the study population had Grade 2 Encephalopathy (34%) followed by grade 4 (26%) and grade 3 (20%) .

The mean age and duration of hospital stay(days) amongst study population was 52.32 ± 6.7years and 5.32 ± 2.08 days respectively . The mean Pulse , SBP and DBP , amongst study population was 80.88 ± 5.4, 110 ± 7.1 and 70.92 ± 7.5 respectively . the mean hemoglobin , WBC , Platelets , BUN(mg/dl), Serum Creatinine(mg/dl), PT and INR amongst study population was 10.98 ± 1, 6604 ± 1679 , 172460 ± 53159, 16.96 ± 2.6 , 1.23 ± 0.2 , 14.28 ± 5.5 and 2.27 ± 0.79 respectively .The mean total bilirubin , SGOT, SGPT , serum albumin and total serum protein amongst study population was 5.99 ± 3.03, 168 ± 75 .53 , 202 ± 71.77, 2.83 ± 0.71 , and 6.07 ± 0.39 respectively

Comparison of serum sodium with Encephalopathy Grade amongst study population

Table no 4 .the mean serum sodium in Grade 1 , grade 2, grade 3, grade 4 was 129 ± 6.02, 125 ± 3 , 126 ± 3.49, 123 ± 3.28 respectively . There was statistically significant difference between serum sodium level and Encephalopathy Grade.**P value – 0.0004**

Table no 5 Comparison of serum sodium with CHILD PUGH SCORE amongst study population the sodium level was significantly lower in grade C as compared to grade A..**Student t test , P value- 0.0001**

In the present study, conducted in patients hospitalized with complications due to liver cirrhosis, the prevalence of hyponatremia at a serum sodium concentration ≤135 mmol/L was 47.9%, and that of severe hyponatremia at a serum sodium concentration ≤130 mmol/L was 27.1%. In fact, the severity of hyponatremia, particularly at serum sodium concentrations ≤130 mmol/L, corresponded to higher risks for developing ascites, hepatic encephalopathy, spontaneous bacterial peritonitis, hepatic hydrothorax, severe ascites, and severe hepatic encephalopathy.

5] Discussion

Hyponatremia is a common abnormal finding in approximately 57% of hospitalized patients with chronic liver disease and in 40% of outpatients with liver disease. Hyponatremia is common in patients with cirrhosis and portal hypertension and is characterized by excessive renal retention of water relative to sodium as a result of reduced solute-free water clearance [1].Research studies have found that hyponatremia can be a useful prognostic marker to assess severity of liver cirrhosis. For many years child-pugh score and MELD have been used to assess severity of chronic liver disease and even for the assessment of the patient to be undertaken for liver transplant[5]. Hyponatremia increases complications in the patients of de-compensated liver cirrhosis. It predisposes to hypovolemic shock, spontaneous bacterial peritonitis due to increase in ascitic fluid.

It also accentuate encephalopathy by causing cerebral edema as due to hypoosmolality extracellular fluid goes into astrocyte and causes cellular swelling.In the present study, the mean serum sodium in Grade 1 , grade 2, grade 3, grade 4 was 129 ± 6.02, 125 ± 3 , 126 ± 3.49, 123 ± 3.28 respectively . There was statistically significant difference between serum sodium level and Encephalopathy Grade[6] This adaptive mechanism explains why patients with chronic hyponatremia and serum sodium concentrations above 120 meq/L are often asymptomatic.

In the present study, the sodium level was significantly lower in child-pugh class C as compared to class A. The low serum sodium level had an impact on severity of liver disease. It is found that patients who had more severe liver disease and who were in class B and class C has hyponatremia[7]. Even patients who had hyponatremia had higher values of PT/INR, serum Bilirubin, serum albumin. Also it is found that patients with hyponatremia had more ascites and higher grades of encephalopathy. All this indicates that patients of liver cirrhosis with more severe disease, if we compare with child-pugh score had low serum sodium levels and so it can be concluded that hyponatremia can be a important prognostic indicator in liver cirrhosis patients[8].

6] Conclusion

Our study found significant association with higher class of Child-Pugh score and the low serum sodium level in Cirrhotic patient. Further prospective studies are needed to determine and identify its correlation with the incidence of possible complications.

Compared with the risk MELD scores have the disadvantage of not reflecting the early deaths in patients with lower MELD scores [2]. Many studies have been conducted recently to examine the clinical usefulness of MELD-Na scores using the serum sodium concentration as a prognostic indicator. In the clinical setting, MELD-Na scores may be more useful than MELD scores for the allocation of livers for transplantation .The serum sodium concentration alone cannot predict the survival rate in patients with liver cirrhosis and that factors other than the serum sodium concentration affect patient survival.

Table no 1 Age group amongst study population

		Frequency	Percent
Valid	41 to 50 years	21	42.0
	51 to 60 years	19	38.0
	more than 60 years	10	20.0
	Total	50	100.0

As seen in the above table, 41 to 50 years (42%) was the most common age group amongst study population followed by 51 to 60 years (38%) and more than 60 years. (20%) As seen in the above table, there was higher number of male (92%) as compared to female (8%) amongst study population

Table no 2 Clinical features amongst study population

Clinical features	Frequency	Percent
Abdominal Distension	12	24.0
Edema Feet	21	42.0
Jaundice	26	52.0
Vomiting	2	4.0
Weakness	6	12.0
Hematemesis	4	8.0
Fever	2	4.0

As seen in the above table, Jaundice (52%) was the most common clinical feature amongst study population followed by Edema Feet (42%) and Abdominal Distension. (23%)

Table no 3 History of alcoholism amongst study population

Past History/History Of Alcoholism	Frequency	Percent	
Valid	Yes	19	38.0
	No	31	62.0
	Total	50	100.0

As seen in the above table, history of alcoholism was present in 38% of study population

Table no 4:Comparison of serum sodium with Encephalopathy Grade amongst study population,

ENCEPHALOPATHY GRADE	Mean	Std. Deviation
Absent Encephalopathy	136.60	3.28
Grade 1	129.60	6.02
Grade 2	125.53	3.00
Grade 3	126.00	3.49
Grade 4	123.62	3.28

As seen in the above table, the mean serum sodium in Grade 1 , grade 2, grade 3, grade 4 was 129 ± 6.02, 125 ± 3 , 126 ± 3.49, 123 ± 3.28 respectively . There was statistically significant difference between serum sodium level and Encephalopathy Grade P value – 0.0004.

Table no 5 Comparison of serum sodium with CHILD PUGH SCORE amongst study population

Grade of CHILD PUGH SCORE	Mean	Std. Deviation
Grade A	136.29	3.094
Grade C	125.07	3.240
Total	126.64	5.062

Student t test , P value- 0.0001

As seen in the above table, the sodium level was significantly lower in grade C as compared to grade A.

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