

Original Research

Hyponatremia in hepatic encephalopathy of chronic liver disease

Dr. Aarti¹, Dr. Amandeep²

¹MD Medicine, Zonal Hospital Dharamshala, H.P., India

²MD Paediatrics, Zonal Hospital Dharamshala, H.P., India

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ABSTRACT

Background: To assess the correlation between hyponatremia in hepatic encephalopathy of chronic liver disease.

Materials & methods: A total of 50 patients were enrolled. All the patients were informed about the nature of the study and their verbal consent was obtained. After taking relevant history and physical examination, the venous blood sample of each patient was drawn. Mild to moderate encephalopathy was classified under grades I-II, while severe encephalopathy was classified under grades III-IV. Further evaluation was done accordingly and result was recorded.

Results: Study included 34 (68%) males and 16 (32%) females. The mean age of the patients was 52.4 years. In patients with hyponatremia, it ranged from 113 to 129 meq/L. Hyponatremia was present in 18 (36%) subjects. 4 (8%) patients had mild hyponatremia, 9 (18%) had moderate, and 5 (10%) had severe hyponatremia. HE was present in 34 (68%) patients. HE grade I was present in 9 (18%), grade II in 11 (22%), grade III in 8 (16%), and grade IV in 6 (12%) patients.

Conclusion: There exists a correlation between the hyponatremia in hepatic encephalopathy of chronic liver disease.

Introduction:

Hyponatremia, a common complication in patients with advanced liver disease and impaired free water clearance, has been shown to be an important predictor of short-term mortality. Hepatic encephalopathy, also a late complication of end-stage liver disease, has been associated with low-grade cerebral edema as a result of swelling of astrocytes.⁽¹⁾ Hyponatremia is an indicator of the worsening of the disease and increases the risk of HE by about eightfold. The severity of hyponatremia is directly related to the deterioration in terms of the grades of HE. Recent studies have concluded that it is a key prognostic factor in patients with chronic liver disease. Moreover, the patients with hyponatremia have poor survival rates as compared to those without hyponatremia.^(2,3,4) It is an important and common clinical problem. The etiology is multifactorial. Hyponatremia may be euvoletic, hypovolemic or hypervolemic.

Proper interpretation of the various laboratory tests helps to differentiate the various types of hyponatremia. Treatment varies with the nature of onset -acute or chronic, severity and symptoms.⁽⁵⁾

Hepatic encephalopathy (HE) or portosystemic encephalopathy (PSE) is a reversible syndrome of impaired brain function occurring in patients with advanced liver failure. However, HE is not a single clinical entity. It may reflect either a reversible metabolic encephalopathy, brain atrophy, brain edema or any combination of these conditions. The mechanisms causing brain dysfunction in liver failure are still unknown. These factors are directly related to liver failure (e.g. decreased metabolism of ammonia). Unless the underlying liver disease is successfully treated, HE is associated with poor survival and a high risk of recurrence.^(6,7)

Materials & Methods:

We conducted the present study to assess the hyponatremia in hepatic encephalopathy of chronic liver disease. A total of 50 patients of both genders with hepatic cirrhosis were considered. Patients with diagnosed hepatic cirrhosis of any etiology who were aged between 30-80 years were included in this study. All the patients were informed about the nature of the study and their verbal consent was obtained. After taking relevant history and physical examination, the venous blood sample of each patient was drawn. Mild to moderate encephalopathy was classified under grades I-II, while severe encephalopathy was classified under grades III-IV. In this study, the severity of liver disease was enlisted according to the Child-Pugh score criteria. The patients were classified into different groups based on the serum sodium concentration as follows: level of

<130 meq/l (significant/severe hyponatremia), between 131 and 135 meq/l (mild hyponatremia), and level of >135 meq/l (normal). All the results were evaluated using SPSS software. P- value of less than 0.001 was taken as significant.

Results:

A study conducted shows that there were 34 (68%) males and 16 (32%) females. The mean age of the patients was 52.4 years. In patients with hyponatremia, it ranged from 113 to 129 meq/L. Hyponatremia was present in 18 (36%) subjects. 4 (8%) patients had mild hyponatremia, 9 (18%) had moderate, and 5 (10%) had severe hyponatremia. HE was present in 34 (68%) patients. HE grade I was present in 9 (18%), grade II in 11 (22%), grade III in 8 (16%), and grade IV in 6 (12%) patients.

Hyponatremia	Hepatic encephalopathy		Total	P-value
	Yes	No		
Yes	13	5	18	<0.001*
No	21	11	32	
Total	34	16	50	

* : Significant

Table 1: Hyponatremia and its correlation with hepatic encephalopathy

Severity of hyponatremia	Grades of hepatic encephalopathy					Total	P-value
	I	II	III	IV	None		
Mild	2	1	0	1	0	4	<0.001*
Moderate	3	2	0	1	3	9	
Severe	0	1	3	1	0	5	
None	4	7	5	3	13	32	
Total	9	11	8	6	16	50	

* : Significant

Table 2: Correlation of severity of hyponatremia with grades of hepatic encephalopathy

Discussion:

Hyponatremia is a wellknown complication of liver failure. It occurs due to fibrosis and leads to increased

cause-specific mortality and a significantly high number of hospital admissions. A study was conducted in which hyponatremia was present in 96 (37%) patients; serum sodium levels among the patients ranged from 113 to 129 meq/L.⁽⁸⁾ Our results are consistent with those of

previous studies. In a study by Khalil et al., it was shown that the prevalence of hyponatremia (serum sodium level of <130 meq/L) was 45.5% among the cohort, with a mean of 123.26 ± 5.57 meq/L.⁽⁹⁾ In another study the prevalence of hyponatremia was found to be 30%.⁽¹⁰⁾ A study done by Jenq et al. revealed that cirrhotic patients with hyponatremia had a higher in-hospital mortality rate.⁽¹¹⁾ In a study conducted by Udagani et al., it was revealed that cirrhotic patients with hyponatremia had a greater risk of developing neurological disorders as compared to those who had normal sodium levels.⁽¹²⁾ Similarly, in the above-mentioned study, the risk of developing HE was found to be 2.8 fold greater in patients with low sodium levels. Hence, the evidence clearly indicates that hyponatremia may affect brain function and predispose patients to HE. We conducted a study, there were 34 (68%) males and 16 (32%) females. The mean age of the patients was 52.4 years. In patients with hyponatremia, it ranged from 113 to 129 meq/L. Hyponatremia was present in 18 (36%) subjects. Among these, 10 (56%) were male and 8 (44.4%) were female. 4 (8%) patients had mild hyponatremia, 9 (18%) had moderate, and 5 (10%) had severe hyponatremia.

Another study with hepatic encephalopathy and chronic liver disease had serum sodium measured.. Hyponatremia was a common feature in patients with cirrhosis and its severity increased with the severity of liver disease. The existence of serum sodium concentration < 135 mmol/L was associated with greater frequency of hepatic encephalopathy compared with patients with serum sodium concentration > 135 mmol/L.⁽¹³⁾ HE was present in 34 (68%) patients. HE grade I was present in 9 (18%), grade II in 11 (22%), grade III in 8(16%), and grade IV in 6 (12%) patients.

Conclusion:

There exists a correlation between the hyponatremia in hepatic encephalopathy of chronic liver disease.

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