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Research Article

HYPONATREMIA IN HEPATIC ENCEPHALOPATHY: AN EXPERIENCE AT TERRITORY CARE HOSPITAL

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Abstract:

Objectives: To find out the frequency of hyponatremia in patients of hepatic encephalopathy at territory care hospital.

Material and methods: This cross-sectional study was conducted at Department of Medicine, Bahawal Victoria Hospital Bahawalpur from July 2019 to December, 2019 over the period of six months. Total 80 patients of hepatic encephalopathy were selected.

Results: Mean age of the patients was 38.34 ± 11.140 years. Hyponatremia was found in 31 (39%) patients. Hyponatremia was noted in 13 (41.94%) patients of age group 18-36 years and 18 (36.73%) patients of age group 37-55 years. Statistically insignificant association of hyponatremia with age was seen with p value 0.6467. Hyponatremia was found in 21 (40.38%) male patients and 10 (35.71%) female patients. But the difference of frequency of hyponatremia between male and female patients was statistically insignificant with p value 0.8109.

Conclusion: Results of this study showed a higher percentage of hyponatremia in patients with HE. Male were more victim of HE as compared to female but insignificant association of hyponatremia with gender is noted. Results of this study also revealed that there is insignificant association of hyponatremia with grade of HE, socio-economic status, area of residence and age.

Key words: Hypertension, hyponatremia, diabetes mellitus, ischemic stroke.

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INTRODUCTION:

Cirrhosis is defined histologically as a diffuse hepatic process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules. The progression of liver injury to cirrhosis may occur over weeks to years. Indeed, patients with hepatitis B and hepatitis C may have chronic hepatitis for as long as 40 years before progressing to cirrhosis. [1]

Hepatic encephalopathy is defined as a spectrum of neuropsychiatric abnormalities in patients with liver dysfunction, after exclusion of brain disease. [2] Hepatic encephalopathy is characterized by personality changes, intellectual impairment, and a depressed level of consciousness. [3] Overt hepatic encephalopathy occurs in about 30-45% of patients with cirrhosis. [4] The development of hepatic encephalopathy negatively impacts patient survival. The occurrence of encephalopathy severe enough to lead to hospitalization is associated with a survival probability of 42% at 1 year of follow-up and 23% at 3 years. [5] Common precipitating factors of hepatic encephalopathy are renal failure, gastrointestinal bleeding, infection, constipation, CNS depressants like opiates and benzodiazepines, diuretic therapy and high protein diet. [6] Patients with advanced cirrhosis commonly develop a functional renal impairment that render the kidney susceptible to retain sodium and solute-free water. In some patients, there is disproportionate retention of water relative to sodium, which leads to a dilutional state where water is retained out of proportion to sodium causing hyponatremia and hypoosmolality. [7] Despite the fact that there is ample data on the relationship and clinical outcomes between serum sodium, hyponatremia, and decompensated cirrhosis, there is little information on the frequency, characteristics, and clinical impact of hyponatremia in patients of hepatic encephalopathy.

MATERIAL AND METHODS:

This cross-sectional study was conducted at Department of Medicine, Bahawal Victoria Hospital Bahawalpur from July 2019 to December, 2019 over the period of six months. Total 80 patients with age 18-55 years either gender (Male & Female) admitted to hospital with diagnosis of hepatic encephalopathy of minimum 24 hr duration were selected. Patients with history of renal failure, history of severe vomiting, history of diarrhea, patients who refused to give consent and diuretic use were excluded from the study.

Blood sample for serum sodium was drawn during first 24 hours of hospital admission and will be processed on the same day in laboratory. Patients will be categorized hyponatremic based on cutt of value less than 130 meq/l.

Data will be entered and analyzed by using SPSS.v.20.0. Mean & Standard Deviation will be calculated for quantitative variables (age, Serum Sodium level and duration of HE (in hours). Frequency & percentages will be calculated for qualitative variables (gender, Hyponatremia, residence, grade of HE, socio-economic status). Effect modifier like age, gender, duration of hepatic encephalopathy, grade of encephalopathy, residence will be controlled through stratification. Post stratification Chi- square test will be applied by taking $p \leq 0.05$.

RESULTS:

Total 80 patients of hepatic encephalopathy were included in this study. Mean age of the patients was 38.34 ± 11.140 years. Hyponatremia was found in 31 (39%) patients. (Fig. 1)

Total 31 (38.75%) patients belonged to age group 18-36 years and 49 (61.25%) patients belonged to age group 37-55 years. Hyponatremia was noted in 13 (41.94%) patients of age group 18-36 years and 18 (36.73%) patients of age group 37-55 years. Statistically insignificant association of hyponatremia with age was seen with p value 0.6467. (Table 1)

Male patients were 52 (65%) and female patients were 28 (35%) and hyponatremia was found in 21 (40.38%) male patients and 10 (35.71%) female patients. But the difference of frequency of hyponatremia between male and female patients was statistically insignificant with p value 0.8109. (Table 2)

Grade 0 HE was noted in 2 (2.5%) patients followed by grade 1 (4 (5%)), grade 2 8 (10%), grade 3 (15 (18.75%)) and grade 4 in 51 (63.75%) patients. Hyponatremia was found in 1 (50%), 1 (25%), 3 (37.5%), 9 (60%) and 17 (33.33%) patients with grade 0, 1, 2, 3 and 4 HE. Statistically insignificant ($P = 0.4183$) association of hyponatremia with grade of HE was noted. (Table 3)

Out of 80 patients of HE, 32 (40%) patients were poor, 25 (31.5%) patients were belonged to middle class and 23 (28.75%) patients were belonged to upper class. Hyponatremia was noted in 11 (34.38%), 10 (40%) and 10 (43.48%) patients respectively in poor, middle and upper class. Insignificant ($P = 0.7827$) association of socio-economic status with hyponatremia was noted. (Table 4)

Total 48 (60%) patients belonged to rural area and 32 (40%) patients belonged to urban area. Hyponatremia was seen in 19 (39.58%) and 12 (37.5%) patients respectively in rural and urban patients. But insignificant ($P = 1.0000$) association

of hyponatremia with area of residence was noticed.
(Table 5)

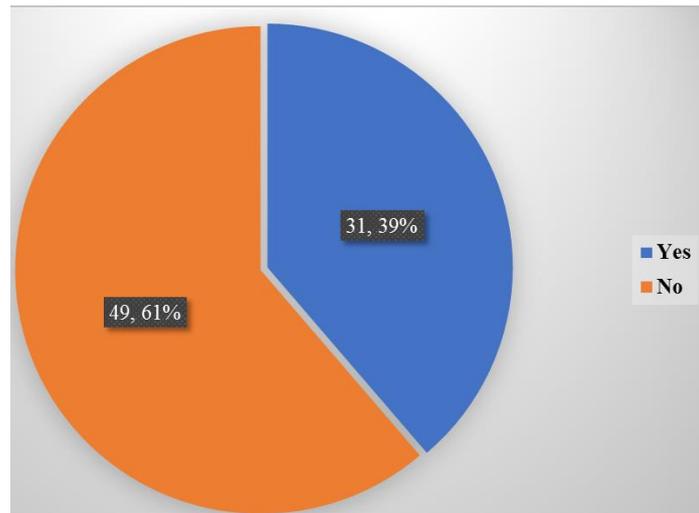


Table 1: Association of hyponatremia with age

Age Group	Hyponatremia		Total	P value
	Yes	No		
18-36	13 (41.94)	18 (58.06)	31 (38.75)	0.6467
37-55	18 (36.73)	31 (63.26)	49 (61.25)	
Total	31 (38.75)	49 (61.25)	80	

Table 2: Association of hyponatremia with gender

Gender	Hyponatremia		Total	P value
	Yes	No		
Male	21 (40.38)	31 (59.62)	52 (65)	0.8109
Female	10 (35.71)	18 (64.29)	28 (35)	
Total	31 (38.75)	49 (61.25)	80	

Table 3: Association of hyponatremia with grade of HE

Grade of HE	Hyponatremia		Total	P value
	Yes	No		
0	1 (50)	1 (50)	2 (2.5)	0.4183
1	1 (25)	3 (75)	4 (5)	
2	3 (37.5)	5 (62.5)	8 (10)	
3	9 (60)	6 (40)	15 (18.75)	
4	17 (33.33)	34 (66.67)	51 (63.75)	
Total	31 (38.75)	49 (61.25)	80	

Table 4: Association of hyponatremia with socio-economic status

Socio-economic status	Hyponatremia		Total	P value
	Yes	No		
Poor	11 (34.38)	21 (65.63)	32 (40)	0.7827
Middle	10 (40)	15 (60)	25 (31.5)	
Upper	10 (43.48)	13 (56.52)	23 (28.75)	
Total	31 (38.75)	49 (61.25)	80	

Table 5: Association of hyponatremia with area of residence

Area of residence	Hyponatremia		Total	P value
	Yes	No		
Rural	19 (39.58)	29 (60.42)	48 (60)	1.0000
Urban	12 (37.5)	20 (62.5)	32 (40)	
Total	31 (38.75)	49 (61.25)	80	

DISCUSSION:

In present mean age of the patients HE was 38.34 ± 11.140 years. Total 38.75% patients belonged to age group 18-36 years and 61.25% patients belonged to age group 37-55 years. Hyponatremia was noted in 41.94% patients of age group 18-36 years and 36.73% patients of age group 37-55 years. Statistically insignificant association of hyponatremia with age was seen with p value 0.6467. Achakzai et al⁸ reported mean age of the patients as 54 years which is higher than our study. In this study hyponatremia was found in 39% patients. Grade 0 HE was noted in 2.5% patients followed by grade 1 in 5%, grade 2 in 10%, grade 3 in 18.75% and grade 4 in 63.75% patients. Hyponatremia was found in 50%, 25%, 37.5%, 60% and 33.33% patients with grade 0, 1, 2, 3 and 4 HE. Statistically insignificant ($P = 0.4183$) association of hyponatremia with grade of HE was noted. In one study by Out of 69 patients with HE 57 had sodium less than 135 ($p < 0.001$).⁹ In a Korean¹⁰ study, prevalence of hyponatremia at a serum sodium 135 mmol/L was 47.9% in hospitalized patients, and that of severe hyponatremia at a serum sodium ≥ 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 and other complications of cirrhosis, compared with the risks in patients with a serum sodium ≥ 136 mmol/L.¹¹ Borroni *et al.*¹⁰ reported hyponatraemia in 30% of cases. In a Pakistani study it was found in 26.7% patients.¹² In one study by SIDDIQUI et al, hyponatremia was

found in 35% patients.¹³ Out of these 20% ($n=20$) were having mild hyponatremia (Na 135-130 mEq/L), 14% ($n=14$) moderate hyponatremia (Na 130-125 mEq/L) and only 1% ($n=1$) severe hyponatremia (Na <125 mEq/L).

Alam et al¹⁴ studied all the factors which worsen hepatic encephalopathy in Pakistani patients. According to them 28% of patients had one or another electrolyte imbalance. Our study was quite similar to them except that we only concentrated on hyponatraemia as a precipitating factor for hepatic encephalopathy. Our frequency of hyponatremia closely resembled the result of Alam et al. This further confirms that a huge proportion of patients is affected by hyponatraemia in our local setup, which may be due to diuretic use.¹⁵ A similar study was done by Maqsood et al¹⁶ which mainly focused on patients suffering from hepatic encephalopathy. This study reported presence of hyponatraemia in 50% of patients, which is far greater figure when compared with our study, as we only reported a frequency of 39%. Studies done on hepatic encephalopathy 15 show similar results when compared with our study. Achakzai et al⁸ reported frequency of hyponatremia as 46%. Of which 23(13%) patients had grade 1 HE while 80(45%), 64(36%) and 10(6%) had grades 2, 3 and 4 respectively.

CONCLUSION:

Results of this study showed a higher percentage of hyponatremia in patients with HE. Male were more victim of HE as compared to female but

insignificant association of hyponatremia with gender is noted. Results of this study also revealed that there is insignificant association of hyponatremia with grade of HE, socio-economic status, area of residence and age.

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