

Research Article

**Frequency of hyponatremia in cases of hepatic encephalopathy presenting at
DG Khan Hospital, DG Khan**

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ABSTRACT

OBJECTIVE: To find out the frequency of hyponatremia in cases of hepatic encephalopathy presenting at DG Khan Hospital, DG Khan

MATERIAL AND METHODS: This cross sectional study was conducted at Department of Medicine, DG Khan Hospital, DG Khan from February 2018 to August 2018. Total 195 patients with hepatic encephalopathy with in 24 hours, having age 20-60 years, both male or female were selected. Hyponatremia was assessed in selected patients.

RESULTS: Total 195 with HE were selected for present study and hyponatremia was analyzed. Mean age of the patients was 41.18 ± 10.64 years and mean duration of HE was 12.25 ± 5.81 hours. Out of 195 patients, hyponatremia was found in 78 (60%) patients. Out of 77 (39.49%) patients of age group 20-40, hyponatremia was noted in 35 (45.45%) patients. Among the 118 (60.51%) patients of age group 41-60 years, hyponatremia was seen in 43 (36.44%) patients. Statistically insignificant association of hyponatremia with age group was noted with p value 0.209. Hyponatremia was noted in 56 (41.79%) male patients and in 22 (36.07%) female patients. Insignificant association of hyponatremia with gender was noted.

CONCLUSION: In present study a higher percentage of hyponatremia was found in cases of HE. 41-60 years age group was most common HE affected age group but development of hyponatremia was not associated age groups. Most of the HE patients were male and higher number of male patients were found with hyponatremia but difference was not statistically significant.

KEY WORDS: Hyponatremia, diabetes mellitus, chronic liver disease, cirrhosis.

INTRODUCTION:

Hepatic encephalopathy reflects a spectrum of neuro-psychiatric abnormalities seen in patients with liver dysfunction, after exclusion of other known causes of brain disease.¹ It is characterized by personality changes, intellectual impairment, asterixis and a depressed level of consciousness.^{2,3} Hepatic encephalopathy is a frequent and serious

complication of chronic liver disease that carries prognostic implications.⁴ It occurs in approximately 30 to 45% of patients with chronic liver disease.⁵⁻⁶ Hyponatraemia is a common feature in advanced liver disease patients.⁷⁻⁸ It occurs as a result of high serum levels of rennin/aldosterone owing to portal hypertension, a

decreased vascular response to vasoactive drugs and a reduced solute free water clearance.⁹

Patients of chronic liver disease have multiple abnormalities in their cardiovascular and renal systems.¹⁰ The consequent inability to adjust the amount of water excreted in urine to amount of water ingested leads to dilutional hyponatraemia.¹¹ One of the most common abnormalities in patients with chronic liver disease is development of hyponatraemia especially in patients with ascites who are also taking diuretics.¹² Hyponatraemia in chronic liver disease has been shown to be an independent predictor of mortality in these patients, as patients with hyponatraemia have poor survival compared with that of having no hyponatraemia.¹³ Furthermore presence of hyponatraemia identifies those patients with hepatic encephalopathy that are more resistant to treatment with lactulose. But its frequency and clinical significance is unclear.¹⁴

There is lack of epidemiological studies on this topic. The results of this study may serve the baseline data for further studies in this part of the country to put forward suggestion for improvement on this aspect of hepatic encephalopathy.

OPERATIONAL DEFINITIONS:

Hyponatremia:

Defined as serum Sodium level < 130 mEq/L.

Hepatic encephalopathy:

Hepatic encephalopathy is defined as a spectrum of neuropsychiatric abnormalities (personality changes, (depressed level of consciousness, deterioration of GCS from 15/15 to 8/15) intellectual impairment (disoriented and confused) in patients with liver dysfunction, (deterioration of liver function tests such as bilirubin > 1mg/dl, ALT > 40U/L, increased prothrombin time difference from control > 4 seconds, decreased albumin < 3.5g/dl) after exclusion of brain disease (meningitis, encephalitis, cerebrovascular accident, malignancy).

MATERIAL & METHODS:

This cross sectional study was conducted at Department of Medicine, DG Khan Hospital, DG Khan from February 2018 to August 2018. Total 195 patients with hepatic encephalopathy within 24 hours, having age 20-60 years, both male or female were selected

Patients with h/o of renal failure, patients of h/o of severe vomiting (> 10 episodes/day), patients of h/o diarrhea (> 10 loose stools/day) and patients using diuretic were excluded from the study.

All the patients fulfilling the inclusion and exclusion criteria were interviewed after informed consent and the study was approved by the ethical committee. Five ml blood sample was taken and sent to laboratory for serum sodium. Findings were noted on pre-designed proforma along with demographic profile of the patients.

All the collected data was entered and analyzed by using SPSS. Version 17. Mean and SD was calculated for age and duration of hepatic encephalopathy. Frequencies and percentages were calculated for gender and Hyponatremia. Stratification was done for age, duration of HE and gender. Post stratification chi-square test was applied to see the effect of these on hyponatremia. P value ≤ 0.05 was considered as significant.

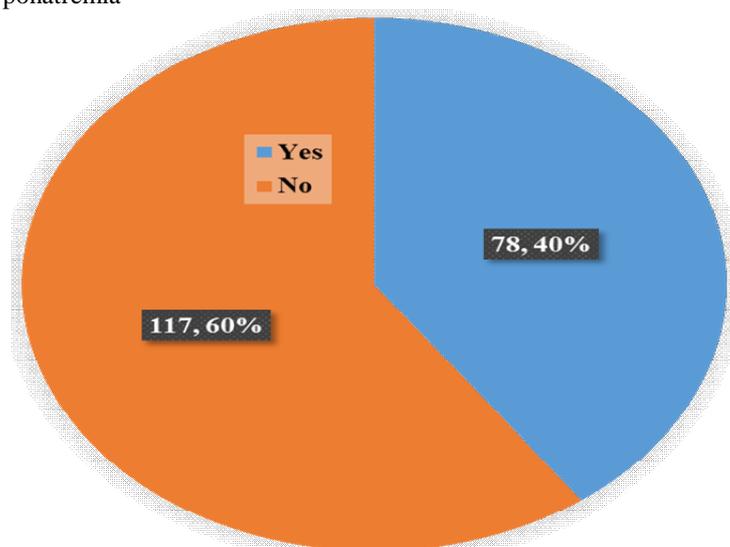
RESULTS:

Total 195 patients with HE were selected for present study and hyponatremia was analyzed. Mean age of the patients was 41.18 ± 10.64 years and mean duration of HE was 12.25 ± 5.81 hours. Out of 195 patients, hyponatremia was found in 78 (60%) patients. (Fig. 1) Patients were divided into two age groups i.e. age group 20-40 years and age group 41-60 years. Out of 77 (39.49%) patients of age group 20-40 years, hyponatremia was noted in 35 (45.45%) patients. Among the 118 (60.51%) patients of age group 41-60 years, hyponatremia was seen in 43 (36.44%) patients. Statistically insignificant association of hyponatremia with age group was noted with p value 0.209. (Table 1)

Male patients were 134 (69%) and female patients were 61 (31%). Hyponatremia was noted in 56 (41.79%) male patients and in 22 (36.07%) female patients. Insignificant association of hyponatremia with gender was noted. (Table 2)

Minimum duration of HE was 1 hour and maximum duration of HE was 24 hours. Two groups was made, 1-12 hours group and 13-24

Fig. 1: Frequency of hyponatremia



hours group. Total 116 (59%) patients belonged to 1-12 hours group and 79 (41%) patients belonged to 13-24 hours group.

Hyponatremia was seen in 47 (40.52%) patients and in 31 (39.24%) patients respectively in 1-12 hours group and 13-24 hours group. Statistically insignificant association between hyponatremia and duration of HE was noted. (Table 3)

Table 1: Association of hyponatremia with age group

Age Group	Hyponatremia		Total	P value
	Yes	No		
20-40	35 (45.45%)	42 (54.55%)	77 (39.49%)	0.209
41-60	43 (36.44%)	75 (63.56%)	118 (60.51%)	
Total	78 (40%)	117 (60%)	195	

Table 2: Association of hyponatremia with gender

Gender	Hyponatremia		Total	P value
	Yes	No		
Male	56 (41.79%)	78 (58.21%)	134 (68.72%)	0.449
Female	22 (36.07%)	39 (63.93%)	61 (31.28%)	
Total	78 (40%)	117 (60%)	195	

Table 3: Association of hyponatremia with duration of HE

Duration of HE	Hyponatremia		Total	P value
	Yes	No		
1-12	47 (40.52%)	69 (59.48%)	116 (59.49%)	0.858
13-24	31 (39.24%)	48 (60.76%)	79 (40.51%)	
Total	78 (40%)	117 (60%)	195	

DISCUSSION:

Cirrhosis is basically a progressive, fibrosing, diffuse and nodular situation that disturbs the complete normal structural design of the liver.¹⁵

Mainly, portal hypertension, spontaneous bacterial peritonitis, hepatorenal syndrome, variceal bleeding and hepatic encephalopathy (HE) are the main complications of cirrhosis.¹⁵ The clinical course of patients having chronic liver disease

(CLD) is often complex due to the development of anomalies in renal function, electrolyte levels and hyponatremia and such are the record common condition seen in these patients.¹⁶ More than half of the cirrhosis patients in Pakistan (51.6%) hold the serum sodium concentration lower than standard range (< 135 meq/L) and 26.7% hold range < 130 meq/L.¹⁷ Hyponatremia is basically common problem of progressive cirrhosis associated with the damage in renal capacity to eradicate solute free water and causes water retention that is unequal to the sodium retention, thus initiating a sodium reduction in serum and hypo-osmolality.¹⁸

Total 195 patients with HE were selected for present study and hyponatremia was analyzed. Mean age of the patients was 41.18 ± 10.64 years and mean duration of HE was 12.25 ± 5.81 hours. In present study hyponatremia was seen in 60% patients of HE. Out of 77 (39.49%) patients of age group 20-40, hyponatremia was noted in 35 (45.45%) patients. Among the 118 (60.51%) patients of age group 41-60 years, hyponatremia was seen in 43 (36.44%) patients. Statistically insignificant association of hyponatremia with age group was noted with p value 0.209. Hyponatremia was noted in 56 (41.79%) male patients and in 22 (36.07%) female patients. Insignificant association of hyponatremia with gender was noted.

In one study by Achakzai et al,¹⁹ a total of 177 patients were studied with the mean age of 54 ± 11 (range 20-80) years. Mean age of the patients in this study was higher than our study. In one study by Qureshi, Out of 69 patients with HE, hyponatremia was noted in 82.6% patients.¹⁷ In another national study by Javid et al,²⁰ total 80 patients with hepatic encephalopathy either male or female were selected. Mean age of the patients was 38.34 ± 11.140 years. Hyponatremia was found in 31 (39%) patients. In a Korean study,²¹ prevalence of hyponatremia at a serum sodium² 135 mmol/L was 47.9% in hospitalized patients, and that of severe hyponatremia at a serum sodium² 130 mmol/L was 27.1%. In another study

by Shaikh et al,²² hyponatraemia (sodium <130 meq/l) was found in 26.7% patients and 24.9% had serum sodium from 131-135 meq/l whereas 48.4% patients had serum sodium >135. Borroni et al. found hyponatremia in 30% patients of HE.²³ SIDDQUI et al found hyponatremia in 35% patients. Out of these 20% patients were having mild hyponatremia (Na 135-130 mEq/L), 14% patients moderate hyponatremia (Na 130-125 mEq/L) and only 1% patients severe hyponatremia (Na <125 mEq/L).²⁴

CONCLUSION:

In present study a higher percentage of hyponatremia was found in cases of HE. 41-60 years age group was most common HE affected age group but development of hyponatremia was not associated age groups. Most of the HE patients were male and higher number of male patients were found with hyponatremia but difference was not statistically significant.

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