

# Frequency of Hyponatremia in Patients with Hepatic Encephalopathy

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## ABSTRACT

**Aim:** To find out frequency of hyponatremia in cases of Hepatic Encephalopathy.

**Methods:** This cross sectional study was conducted at Department of Pathology, Quaid-e-Azam Medical College Bahawalpur from March 2020 to September 2020. Total 190 patients of HE from Department of Medicine Bahawal Victoria Hospital, Bahawalpur were selected and hyponatremia was analyzed in selected patients.

**Results:** Mean age of the patients was  $39.43 \pm 12.90$  mean duration of HE was  $8.21 \pm 5.50$  hours. Out of 190 patients, hyponatremia was found in 63 (33%) patients. Total 105 (55.26%) patients belonged to age group 20-40 years and 85 (44.74%) patients belonged to age group 41-60 years. Hyponatremia was noted in 38 (36.19%) patients of age group 20-40 years and in 25 (29.41%) patients of age group 41-60 years. 1-12 hours group was consisted on 150 (78.95%) patients while 13-24 hours group was consisted on 40 (21.05%) patients. Hyponatremia was found in 43 (28.67%) patients of 1-12 hours group and in 20 (50%) patients of 13-24 hours group. Statistically significant association between hyponatremia and duration of HE was noted with p value 0.011.

**Conclusion:** Findings of present study showed a higher rate of hyponatremia in cases of HE. Most of the cases were between 20-40 years. A higher number of male patients found suffering from HE as compared to female patients. Most of the patients reported within 12 hours of onset of HE and hyponatremia was significantly associated with duration of HE.

**Keywords:** Hepatic encephalopathy, hyponatremia, liver cirrhosis, ischemic stroke.

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## INTRODUCTION

Hepatic encephalopathy (HE) manifests as a broad range of complex cognitive disturbance occur because of liver damage.<sup>1</sup> HE has been reported in cirrhotic patients with 8% rise annually. It remains a serious complication of liver cirrhosis<sup>2</sup>. There are various precipitants of hepatic encephalopathy like constipation occurring in 78.1% cases, esophageal variceal bleed occurred in 14.8% cases and infections in 12.1% cases.<sup>3</sup> The presence of hyponatremia suggests third spacing as a result of compromise of liver synthetic functions. It had been evident that there are increase chances to develop electroencephalographic abnormalities and HE in the existence of hyponatremia and sometimes refractory to treatment with lactulose. The process that leads to precipitation of HE as a result of hyponatremia is not fully known, but it has been postulated that it leads to swelling of astrocyte as a result of osmotic gradient between extracellular fluid compartment<sup>4</sup>. Samiullah Shaikh and others recorded that 21/112 (18.75%) hepatic encephalopathic had hyponatremia<sup>5</sup>. Another recent local study reported the frequency to be in 57.9% of the cases<sup>5</sup>. In study of Javid et al,<sup>6</sup> 39% patients of hepatic encephalopathy had hyponatremia. Qureshiet al<sup>7</sup> assessed 69 patients with HE for hyponatremia and found hyponatremia in 57 patients. In another study by Hashmat et al,<sup>8</sup> 21.6% patients of hepatic encephalopathy had hyponatremia.

The objective of present study was to evaluate hyponatremia in cases of HE. Results of this study may help us to decrease morbidity and mortality of such patients by early management of hyponatremia.

### Operational Definitions:

**Hyponatremia:** Hyponatremia: Serum Sodium < 130 mEq/L.

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**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 AND METHODS

This cross sectional study was conducted at Department of Pathology, Quaid-e-Azam Medical College Bahawalpur from March 2020 to September 2020. Total 190 patients of HE as per operational definition, age 20-60 years either male or female were selected from Department of Medicine Bahawal Victoria Hospital, Bahawalpur. Study was approved by the ethical committee and written informed consent was taken from patients/attendants. Patients with history of vomiting, diarrhea and renal failure were excluded from the study. Five ml blood sample of all the patients was drawn and sent to laboratory for serum sodium levels. Findings were noted on predesigned performa along with demographic profile of the patients. Hyponatremia was labelled as per operational definition.

Data was entered on computer software SPSS version 16. The quantitative variables of the study i.e. age and duration hepatic encephalopathy were presented as Mean  $\pm$  SD. The qualitative variables like gender, frequency of hyponatremia were presented as frequency and percentages. Pie chart was drawn for frequency of hyponatremia. Stratification was done for age, duration of hepatic encephalopathy and gender was done. Post stratification chi-square test was applied. P. value  $\leq$  0.05 was considered as significance.

**RESULTS**

Mean age of the patients was 39.43±12.90 mean duration of HE was 8.21±5.50 hours. Out of 190 patients, hyponatremia was found in 63 (33%) patients (Fig. 1).

Selected patients were divided into two age groups i.e. age group 20-40 years and age group 41-60 years. Total 105 (55.26%) patients belonged to age group 20-40 years and 85 (44.74%) patients belonged to age group 41-60 years. Hyponatremia was noted in 38 (36.19%) patients of age group 20-40 years and in 25 (29.41%) patients of age group 41-60 years. Statistically insignificant association between hyponatremia and age group was noted with p value 0.324. (Table 1)

Total 102 (53.68%) patients were male and 88 (46.32%) patients were female. Hyponatremia was found in 38 (37.25%) male patients and in 25 (28.41%) female patients. Association of hyponatremia with gender was not significant (P=0.197) statistically (Table 2).

Division of Patients was done in two equal groups according to duration of HE i.e. 1-12 hours group and 13-24 hours group. 1-12 hours group was consisted on 150 (78.95%) patients while 13-24 hours group was consisted on 40 (21.05%) patients. Hyponatremia was found in 43 (28.67%) patients of 1-12 hours group and in 20 (50%) patients of 13-24 hours group. Statistically significant

association between hyponatremia and duration of HE was noted with p value 0.011. (Table 3)

Fig. 1: Frequency of hyponatremia

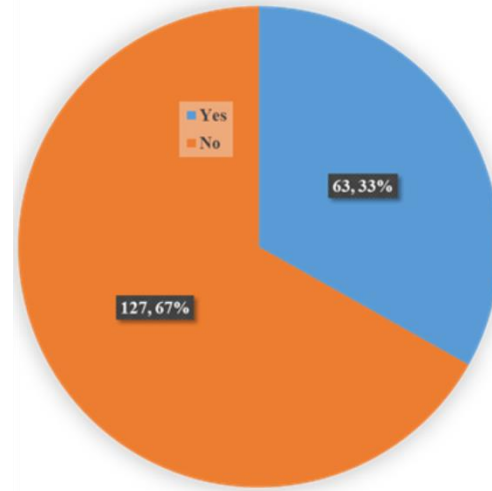


Table 1: Association of hyponatremia with age

Age Group	Hyponatremia		Total	P value
	Yes	No		
20-40	38 (36.19)	67 (63.81)	105 (55.26)	0.324
41-60	25 (29.41)	60 (70.59)	85 (44.74)	
Total	63 (33)	127 (67)	190	

Table 2: Association of hyponatremia with gender

Gender	Hyponatremia		Total	P value
	Yes	No		
Male	38 (37.25)	64 (62.75)	102 (53.68)	0.197
Female	25 (28.41)	63 (71.59)	88 (46.32)	
Total	63 (33)	127 (67)	190	

Table 3: Association of hyponatremia with duration of HE

Duration of HE (Hours)	Hyponatremia		Total	P value
	Yes	No		
1-12 Hours	43 (28.67)	107 (71.33)	150 (78.95)	0.011
13-24 Hours	20 (50)	20 (50)	40 (21.05)	
Total	63 (33)	127 (67)	190	

**DISCUSSION**

Globally, liver cirrhosis is the leading cause of mortality and morbidity.<sup>9</sup>In under developed countries, it is one of the most common medical problem, which results burden on health care system. Common complications of cirrhosis are HE, variceal bleeding and ascites.<sup>10</sup>Growth rate of HE in cases of cirrhosis is 8%.<sup>11</sup>

The objective of present study was to assess frequency of hyponatremia in cases of hepatic encephalopathy. Mean age of the patients was 39.43±12.90 mean duration of HE was 8.21±5.50 hours. Total 105 (55.26%) patients belonged to age group 20-40 years and 85 (44.74%) patients belonged to age group 41-60 years. In one study by Bashir et al,<sup>12</sup> mean age of the patients of HE was 52.02±9.65 years which is little high than our study. In

same study total 24 (20.87%) having age of 20-45 years whereas 91 (79.13%) were having age of 46-70 years. In study of Javid et al,<sup>13</sup> mean age of the patients was 38.34±11.140 years which is comparable with our study.

In present study, out of 190 patients with HE, hyponatremia was found in 63 (33%) patients. Samiullah Shaikh and others recorded that 21/112 (18.75%) hepatic encephalopathic had hyponatremia<sup>5</sup>. Another recent local study reported the frequency to be in 57.9% of the cases<sup>5</sup>. In study of Javid et al<sup>6</sup> 39% patients of hepatic encephalopathy had hyponatremia. Qureshi et al<sup>7</sup> assessed 69 patients with HE for hyponatremia and found hyponatremia in 57 patients. In another study by Hashmat et al,<sup>8</sup> 21.6% patients of hepatic encephalopathy had hyponatremia. In another study by Bashir et al,<sup>12</sup> frequency of hyponatremia in patients with hepatic encephalopathy

was recorded as 62(53.91%). Javid et al<sup>13</sup> found hyponatremia in 39% patients of HE.

In present study, total 102(53.68%) patients were male and 88(46.32%) patients were female. In study of Bashir et al,<sup>12</sup> gender distribution shows that 64(55.65%) were male and 51(44.35%) were females which is comparable with our study. In study of Javid et al,<sup>13</sup> male patients were 52 (65%) and female patients were 28(35%). Arshad et al<sup>14</sup> reported mean age  $65\pm 0.315$  in patients of HE.

## CONCLUSION

Findings of presents study showed a higher rate of hyponatremia in cases of HE. Most of the cases were between 20-40 years. A higher number of male patients found suffering from HE as compared to female patients. Most of the patients reported within 12 hours of onset of HE and hyponatremia was significantly associated with duration of HE.

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