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ORIGINAL ARTICLE

Frequency of Complications by Serum Sodium Level among Patients with Liver Cirrhosis

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ABSTRACT

Background: Cirrhosis is a life-threatening and incurable condition. It is a leading cause of death and disease all over the globe. Fluctuations in blood sodium levels are a common consequence of advanced cirrhosis

Objective: To determine frequency of complications by serum sodium level among patients with liver cirrhosis.

Methodology: This descriptive Cross sectional study was carried out at the Department of Medicine, Khyber Teaching Hospital, Peshawar from Mar 1, 2021 to Aug 31, 2021. The severity of cirrhosis was measured using Child-Pugh Scores for all patients after a thorough history and examination. Blood samples from all patients were obtained under stringent aseptic conditions and sent to the hospital laboratory. The level of sodium in the serum was tested under the observation of a pathologist having more than 10 years of pathology experience.

Results: In our study, amongst 210 subjects, 125 (59.52%) were males whereas 85(40.48%) were females. The spontaneous bacterial peritonitis among liver cirrhosis was observed in 42(20%) patients and Encephalopathy was observed in 48(22.9%) cases.

Conclusion: Low levels of sodium in serum are a prevalent trait in individuals with cirrhosis, according to the findings of this research. Serum sodium concentrations <130 meq/l is associated with an increased risk of Spontaneous Bacterial Peritonitis and hepatic encephalopathy in cirrhotic patients.

Keywords: Serum sodium, Hepatic Encephalopathy, Spontaneous Bacterial Peritonitis

INTRODUCTION

Cirrhosis is a life-threatening and incurable condition. It is a leading cause of death and disease all over the globe. It is also a prevalent cause of death among the Pakistani people, as well as a common reason for hospitalization in the hospitals of our country. Cirrhosis occurs in around 10%-20% of people between the ages of 5 and 30 years. In contrast to the West, where alcohol is consumed more, the most frequent cause is viral hepatitis [1].

Fluctuations in blood sodium levels are a common consequence of advanced cirrhosis. They are caused by a decrease in the renal ability to remove solute-free water, which results in an excess of water retention relative to retention of sodium, resulting in a decrease in concentration of serum sodium and hypoosmolality [2]. Patients with de-compensated cirrhosis are more likely to have hyponatremia, which is caused by a malfunction in the body's fluid homeostasis control [3].

In patients with no liver disease, individuals with low serum sodium are more likely to have a range of neurological symptoms connected to brain edema, like disorientation, headache and confusion, as well as more generalized neurological impairments and seizures, which may lead to death from a herniated cerebrum [4]. The amount of osmolality and sodium in the extracellular fluid corresponds approximately with the severity of neurological symptoms in individuals with low serum sodium[5].

Ascites is more severe in those with low serum sodium. Patients with a blood sodium level of less than 130 meq/l were more likely to develop hepatic encephalopathy [6]. In serum sodium concentrations 130 had 43.1% Hepatic encephalopathy, In serum sodium concentrations between 131-135 had 35.8% Hepatic encephalopathy and serum sodium concentrations >136 had 24.4% Hepatic encephalopathy [7]. As compared to patients with a serum sodium concentration of ≥136 mmol/L, those with serum sodium concentrations lower than ≤130 mmol/L were more likely to experience problems [7].

The present study is designed to determine the frequency of complications among patients with liver cirrhosis presenting with different serum sodium level**.** As previously stated, blood sodium levels are a significant predictor of the severity of hepatic encephalopathy, and research suggests that the frequency of serum sodium levels and the severity of liver cirrhosis vary. Before ending the regular monitoring and baseline screening in patients with cirrhosis, we will communicate the findings of this research with other local gastroenterologists and urge further investigations on its prognostic importance.

MATERIALS AND METHODS

This descriptive Cross sectional study was carried out at the Department of Medicine, Khyber Teaching Hospital, Peshawar from Mar 1, 2021 to Aug 31, 2021. By using WHO calculator a sample size of 210 was calculated [7]. Non probability consecutive sampling technique was used in our study. All the subjects of both the sex with age more than 18 years and having liver cirrhosis (Child-Pugh Scores 5 to 15) confirmed on ultrasonography were included in our study while chronic renal failure patients on haemodialysis, acute fulminant hepatitis patients and patients with other co-morbidities like hypertension and diabetes were

excluded from our study. Proper approval was given by the institutional ethical and research committee. Informed consent was signed from all the subjects. The severity of cirrhosis was measured using Child-Pugh Scores for all patients after a thorough history and examination. Blood samples from all patients were obtained under stringent aseptic conditions and sent to the hospital laboratory. The level of sodium in the serum was tested under the observation of a pathologist having more than 10 years of pathology experience. SPSS version 16 was used for the analysis of all the data. For continuous variables, mean (± SD) were calculated whereas frequencies (%) were computed for categorical variable.

RESULTS

In our study, amongst 210 subjects 125 (59.52%) were males whereas 85(40.48%) were females. Average age of the patients was 51.01years+14.37SD with range of 18-71 years. Patient's age was divided in four categories, out of which most common age group for liver cirrhosis was more than 60 years in our study. Average serium sodium level in patients with liver cirrhosis was 159.13 mmol/L +5.82SD. Majority of patients have more than or equal to 130mmol/L serium sodium level while 93(44.29%) patients have less than 130mmol/L serium sodium level. (Table 1) The spontaneous bacterial peritonitis among liver cirrhosis was observed in 42(20%) while in 168(80%) patients show no spontaneous bacterial peritonitis. Encephalopathy was observed in 48(22.9%) of patients and in which majority of patients have Grade II Encephalopathy. (Table 2)

Table 1: Demographic and clinical parameters of the subjects

Parameter	Category	Frequency (%)
Gender	Male	125 (59.52%)
	Female	85(40.48%)
Age	≤30.00	23 (11%)
	31.00 - 45.00	58 (27%)
	46.00 - 60.00	63 (30%)
	≥61.00	66 (31%)
Serum-Sodium level	<130mmol/L	117 (55.71%)
	≥130mmol/L	93(44.29%)

Table 2: Complications associated due to low serum sodium level in liver cirrhosis patients

Parameter	Category	Frequency (%)
Spontaneous Bacterial Peritonitis	Yes	42 (20%)
	No	168 (80%)
Encephalopathy	Yes	48 (22.9%)
	No	162 (77.1%)
Grade of Encephalopathy	Grade I	10 (4.8%)
	Grade II	18 (8.6%)
	Grade III	13 (6.2%)
	Grade IV	7 (3.3%)

DISCUSSION

A decrease in sodium levels <130 mmol/L is presently considered hyponatremia in cirrhosis [8]. Hyponatremia is a common consequence of cirrhosis and ascites that is also linked with an elevated risk of morbidity and death, the significance of which is becoming more highlighted [5].

60% of patients were males, compared to 40% of females, and 64% were in their third or fourth decade of life. Males are 6 times more likely than females to acquire and suffer from liver disease, according to previous studies. Among the western world, however, alcoholism is the leading cause of CL, putting it the fourth most cause of mortality in men in the United States [9]. The observations might simply be a symptom of our society's gender prejudice, in which men are given precedence for therapy and hospitalization over females [10].

We detected electrolyte imbalance in 56% of our cases, which corresponds with the liver disease severity [11] and could be regarded not only a precipitant, but also a sign of the advanced form of cirrhosis in these individuals. In accordance with our findings, another study reported similar results [12].

The Incidence of Spontaneous bacterial peritonitis (SBP) in our study was 20 %. This is comparable to the results of a study conducted by Lata J et al, from Czech Republic, in which SBP was reported in 35.4 % of cirrhotic Patients [13]. In another study from India, Jain et al. showed figure of 34.92% [14]. This study also nearly correlates with the present study. In a local study from Agha Khan University Hospital Karachi reported SBP in 33% [15]. This is also comparable to our study. Few of the local studies show a very high incidence of SBP. In one study conducted by Iqbal S et al at Khyber teaching hospital Peshawar Incidence of SBP was reported in 51% [16]. Obstein KL et al, reported 26.12% incidence in one study recently published [17].The probable reasons for such a high incidence in our set up may be late referral, ignorance, poverty, malnutrition, high prevalence of infectious diseases and lack of preventive measures.

In our study, encephalopathy was observed in 48(22.9%) of patients and in which majority of patients have Grade II Encephalopathy. The presence of encephalopathy was found in 38% of the patients in a previous study done by Paolo Angeli [5]. Patients with cirrhosis have been shown to have lower concentrations of organic osmolytes in their brains due to compensatory osmoregulatory mechanisms against cell swelling caused by a confluence of high intracellular glutamine from hyperammonemia and low extracellular sodium, as has been shown to occur when blood sodium levels are low [18, 19].

CONCLUSION

Low levels of sodium in serum are a prevalent trait in individuals with cirrhosis, according to the findings of this research. Ascites is more difficult to treat with serum sodium concentrations of less than 135 meq/l and more often results in hepatic encephalopathy than in people with levels that are within the normal range (>135 meq/l), necessitating higher doses of diuretics or recurrent paracentesis. Serum sodium concentrations <130 meq/l is associated with an increased risk of Spontaneous Bacterial Peritonitis and hepatic encephalopathy in patients.

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