VOLUME-9, ISSUE-6, JUNE-2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

General Medicine

CORRELATION OF HYPONATREMIA WITH SEVERITY OF HEPATIC ENCEPHALOPATHY

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ABSTRACT

Aim: To assess the frequency of hyponatremia in patients with hepatic encephalopathy (HE) and to correlate the severity of hyonatremia with grade/severity of HE at presentation.

Study Design: Observational study.

Place and Duration of Study: Hangal Shri Kumareshwar Hospital, Bagalkot, Karnataka, from January 2019 to January 2020.

Methodology: A total of 62 patients with hepatic encephalopathy were studied. The HE was graded according to the West Haven classification (4 grades) and level of serum sodium was noted in each patient at presentation. Severity of Hepatic Encephalopathy and hyponatremia was correlated using the Freeman – Halton extension of Fisher's exact probability test.

Results: Out of 62 patients, 36 (58.06%) had serum sodium less than 135 meq/L. Of all the patients with HE, 37 had grade I HE, 16 had grade II HE, 9 had grade III HE and none had grade IV HE. Only 2 (7.7%) patients with normal serum sodium had gradeIII-IVHE, as compared to 7 (19.4%) patients with hyponatremia (p=0.03).

Conclusion: Hyponatremia was a common feature in patients with hepatic encephalopathy and the severity of hyponatremia correlated with the grade/severity of encephalopathy.

KEYWORDS : hepatic encephalopathy, hyponatremia, correlation

INTRODUCTION

Liver cirrhosis is a leading cause of mortality and results in serious complications like hepatic encephalopathy, portal hypertension and its consequences like variceal hemorrhage, ascitis and hepatorenal syndrome. Hepatic encephalopathy is a common complication (30-45%) of cirrhosis of liver[1]. Abnormalities in renal function and electrolyte levels are common in cirrhosis with hyponatremia (<135 meq/L) present in more than one half of the patients[2]. The causes of hyponatremia in cirrhosis are multiple including impairment in renal capacity for free water clearance, increased avp secretion and diuretic use. Recent studies indicate that hyponatremia is a key accomplice in the pathophysiology of hepatic encephalopathy in cirrhosis and not just an innocent bystander[4]. In a study conducted in a government medical college in south Kerala, hyponatremia occurred in 57% of hospitalized patients with cirrhosis[2].

The aim of the present study was to assess the frequency of hyponatremia in patients with hepatic encephalopathy (HE) and to correlate the severity of hyonatremia with severity/grade of hepatic encephalopathy at presentation in a tertiary care centre.

MATERIALS AND METHODS

This prospective study included 62 consecutive patients presenting with hepatic encephalopathy admitted to the General Medicine department at HSK Hospital, Bagalkot, from January 1, 2019 to December 31, 2019. All admitted patients who were above 18 years with establishedcirrhosis of any etiology and in Hepatic encephalopathy were included in the study. Cirrhosis was confirmed by clinical, biochemical and ultrasonographic findings.

Hepatic encephalopathy(HE) was diagnosed after excluding infections, metabolic problems, intracranial vascular events, knowledge of precipitating factors, and/or an earlier diagnosis of HE determined by history. The HE was graded according to the West Haven classification (4 grades). Grade I and grade II were taken as mild and moderate HE, while grade III and IV were taken as severe HE.

Data was collected including the patient's age, gender, presence of encephalopathy, liver function test and serum electrolytes. Patients were divided into 3 groups according to serum sodium concentration as follows: level >135 meq/l (normal), between 130 and 135 meq/l (mild hyponatremia), and <130meq/l (significant hyponatremia).

Data was analyzed using Statistical Package for Social (SPSS) version 20. Frequencies of all variables were calculated using frequency tables. Sodium levels were correlated with severity of HE using Freeman-Halton extension of Fisher exact test of statistical significance. P value of less than 0.05 was considered significant.

RESULTS

In the current study, we analyzed 62 patients with hepatic encephalopathy who were admitted in a tertiary care centre. Out of 62 patients, 60 (96.8%) were males and only 2 (3.2%) were females.

Fourteen (22.6%) patients were over the age of 60 years. 26 (41.9%) patients had normal serum sodium levels >135 meq/L, whereas 36 (58.1%) had hyponatremia (<135 meq/L) and 14 (22.6%) had significant hyponatremia (<130 meq/L)(Figure 1).

Patients with significant hyponatremia correlated with more severe grades of hepatic encephalopathy (Figure 2) at a P value of 0.03 by Freeman – Halton extension of Fisher exact test.

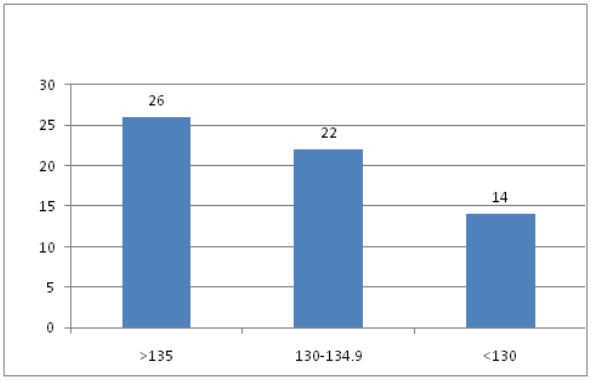

Figure 1: Showing number of patients in relation to level of serum sodium (in meq/l).

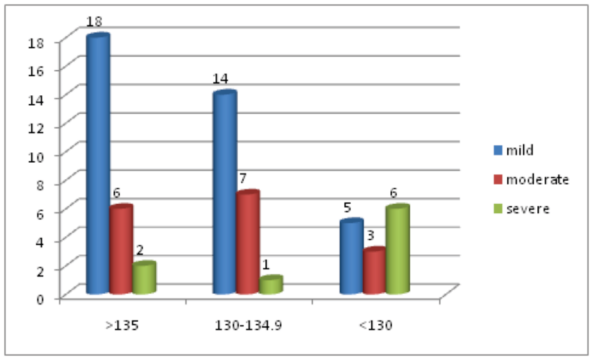

Figure 2: Showing severity of hepatic encephalopathy in relation to serum sodium.

DISCUSSION

Hyponatremia is a common electrolyte imbalance in patients with cirrhosis of liver. These hyponatremia cases are mostly dilutional in nature [4,5]. There is a functional intrarenal hemodynamic disorder in cirrhosis along with a strong stimulation of rennin angiotensin aldosterone system (RAAS) and a high level of circulating vasopressin. This coupled with the decrease in effective arterial volume due to splanchnic vasodilation contributes to the dilutionalhyponatremia in cirrhosis. Overuse of diuretics is another contributing factor for mild hyponatremia in most patients.

In a Korean study, prevalence of hyponatremia at a serum sodium <135 mmol/L was 47.9% in hospitalized patients, and that of more severe hyponatremia at a serum sodium <130 mmol/L was 27.1% [6]. The severity of hyponatremia, particularly at serum sodium concentration <130 mmol/L, corresponded to higher risk of developing complications of cirrhosis including hepatic encephalopathy as compared with the risks in patients with a serum sodium >135 mmol/L.

Results of this study indicate that more than half (58%) of the patients had serum sodium values below the normal range (<135 meq/L) and 22.6% patients had values <130 meq/L. Low sodium levels were more frequent in patients with severe hepatic encephalopathy (grade III and IV). As per Muhammad Omar Qureshi et al [7]more than one half (57.9%) of patients had values of serum sodium concentration < 135 meq/l and 30.7% had values <130 meq/L in patients of cirrhosis[7]. Their study also showed a higher frequency of severe (grade III-IV) hepatic encephalopathy with increasing severity of hyponatremia.

The relationship between hepatic encephalopathy and serum sodium levels may be explained on the basis that the two events may be pathophysiologically linked[8]. Hepatic encephalopathy has been associated with low grade cerebral oedema as a result of swelling of astrocytes. Ammonia – induced glutamine accumulation triggers low grade cerebral oedemaand efflux from the cell of other osmotically active compounds, principally myo-inositol from the astrocytes.Hyponatremia also promotes astrocyte swelling probably in synergy with ammonia. A major advance in our ability to treat hyponatremia is the introduction and approval of aquaretics (vaptans) which are vasopressin V2 receptor antagonists [9].

CONCLUSION

Hyponatremia was common in patients with hepatic encephalopathy. Also, significant hyponatremia was associated with a higher grade/severity of hepatic encephalopathy. Close monitoring of serum sodium concentration is required in patients with hepatic encephalopathy with equal importance to correction of hyponatremia to prevent the deterioration of encephalopathy.

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