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Medicine

ASSOCIATION BETWEEN SEVERITY OF COMPLICATIONS AND SERUM SODIUM IN PATIENTS OF CHRONIC LIVER DISEASE

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ABSTRACT

Background: Cirrhosis is the end result of chronic liver injury from a variety of causes. It is well recognized in many studies that complicated chronic liver disease is accompanied by hyponatremia. Hyponatremia is a common abnormal finding in approximately 57% of hospitalized patients with chronic liver disease and in 40% of out patients with liver disease.

Aim of work: The purpose of the present work is to study the association between serum sodium level and the severity of complications in liver cirrhosis

Subjects and Methods: Sixty patients with complicated chronic liver disease and 40 patients with uncomplicated chronic liver disease were randomly selected from Internal Medicine department . . Complications included ascites, hepatic encephalopathy, spontaneous bacterial peritonitis,hepatorenal syndrome, esophageal and gastric varices, were classified based on severity. Patients with hepatocellular carcinoma, any other malignancy or other major organ failure presented at admission and during the follow up, also patients taking antiviral drugs were excluded .

Observation: Out of 100 patients of chronic liver disease , 60 patients had complications like Spontaneous bacterial peritonitis, hepatorenal syndrome, hepatic encephalopathy or hepatic encephalopathy. The decrease in serum sodium level strongly correlated with hepatic encephalopathy, ascites , hepatorenal syndrome and SBP (p value <0.05). However, there was no correlation between serum sodium levels with varix .

Conclusion: Hence, we could conclude from our study that Hyponatremia, especially serum sodium levels <125 mmol/ was associated with severe complications like ascites, HRS, SBP and hepatic encephalopathy.

KEYWORDS : Ascites, Hepatorenal syndrome, Hyponatremia, Spontaneous bacterial peritonitis, Varix

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. The natural history of cirrhosis can be divided into a preclinical and a subsequent clinical phase .The preclinical phase is usually prolonged over several years; once clinical events occur, such as, ascites, encephalopathy, variceal bleeding develops the remaining course of the disease is much shorter and usually fatal. For the liver cirrhosis there is still no curable treatment available except for liver transplantation. The most common complications are: gastrointestinal hemorrhage, ascites, encephalopathy, spontaneous bacterial peritonitis, hepatorenal syndrome and hepatic failure[1].

Hyponatremia is a common abnormal finding in approximately 57% of hospitalized patients with chronic liver disease and in 40% of outpatients with liver disease. These conditions occur as a result of high serum levels of renin/aldosterone owing to portal hypertension, a decreased vascular response to vasoactive drugs, and a reduced solute-free water clearance.[2]

According to several studies, hyponatremia occurring as a result of a reduced solute-free water clearance was a key prognostic factor in patients with liver cirrhosis.[3]

The aim of the present work is to study the association between serum sodium level and the severity of complications in liver cirrhosis.

Materials and methods

The study was done on 100 patients of chronic liver disease (identified by history ,physical examination, ultrasonography) admitted in department of medicine in Rajendra Institute of Medical sciences between September,2017 to April,2018. Out of 100 patients of chronic liver disease, 60 patients had complicated chronic liver disease and 40 patients had uncomplicated chronic liver disease. Complications included ascites , hepatorenal syndrome, spontaneous bacterial peritonitis, development of encephalopathy and esophageal varices. Ascites, esophageal varices and hepatic encephalopathy were further graded based on severity.

Ascites was graded into 3 types – mild ascites: that is detected by imaging but not evident by clinical examination ,moderate ascites: ascites easily recognized on examination, severe ascites: ascites recognized on examination but also requiring large volume paracentesis for therapeutic purposes.

All patients of complicated and uncomplicated chronic liver disease were subjected to:

a) Complete history taking
b) physical examination
c) ultrasonography of the abdomen
d) endoscopy of the upper gastrointestinal tract
e) complete blood count and liver function test
f)serum sodium and potassium

Microsoft excel was used for data plotting and SPSS v.22 was used for data analysis.

Observation

Out of 100 patients of chronic liver disease , 60 patients had complications (Table 1) like Spontaneous bacterial peritonitis, hepatorenal syndrome, hepatic encephalopathy or hepatic encephalopathy.

Table 1 Chronic liver disease with complications

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	uncomplicat	40	40.0	40.0	40.0

	complicated	60	60.0	60.0	100.0
	Total	100	100.0	100.0	

Hepatic encephalopathy was present in 19 out of 60 complicated patients of chronic liver disease. Out of total patients with hepatic encephalopathy, 70 % patients with severe hepatic encepaholopathy had severe hyponatremia as compared to only 33.3% patients with mild hepatic encephalopathy (Table 2)-p value <0.05

Table 2-Hyponatremia in patients of chronic liver disease with hepatic encephalopathy

			serum_sodium			Total
			>135	125-134	<125	
encephalopathy	absent	Count	27	14	0	41
		% within encephalopathy	65.9%	34.1%	0.0%	100.0%
	mild	Count	2	4	3	9
		% within encephalopathy	22.2%	44.4%	33.3%	100.0%
	severe	Count	0	3	7	10
		% within encephalopathy	0.0%	30.0%	70.0%	100.0%
Total		Count	29	21	10	60
		% within encephalopathy	48.3%	35.0%	16.7%	100.0%

Spontaneous bacterial peritonitis (SBP) was present in 19 out of 60 complicated patients of chronic liver disease. Out of total patients with SBP , 52.6% patients with SBP had severe hyponatremia as compared to nil in patients with no SBP (Table 3) and the relation was statistically significant (p value<0.05)

Table 3-Hyponatremia in patients of chronic liver disease with spontaneous bacterial peritonitis

			serum_sodium			Total
			>135	125-134	<125	
sbp	absent	Count	29	12	0	41
		% within sbp	70.7%	29.3%	0.0%	100.0%
	present	Count	0	9	10	19
		% within sbp	0.0%	47.4%	52.6%	100.0%
Total		Count	29	21	10	60
		% within sbp	48.3%	35.0%	16.7%	100.0%

Hepatorenal syndrome (HRS) was present in 13 out of 60 complicated patients of chronic liver disease. There was a significant correlation of hyponatremia with HRS (p value <0.05) (Table 4)

Table 4-Hyponatremia in patients of chronic liver disease with Hepatorenal syndrome

			serum_sodium			Total
			>135	125-134	<125	
hepatorenal	absent	Count	29	18	0	47
		% within hepatorenal	61.7%	38.3%	0.0%	100.0 %
	one	Count	0	0	6	6
		% within hepatorenal	0.0%	0.0%	100.0%	100.0 %
	type two	Count	0	3	4	7
		% within hepatorenal	0.0%	42.9%	57.1%	100.0 %
Total	Count	29	21	10	60	
	% within hepatorenal		48.3%	35.0%	16.7%	100.0 %

Ascites was present in 55 out of 60 complicated patients of chronic liver disease. 55.7% of patients with severe ascites had more hyponatremia as compared to only 16.7% patients with moderate ascites. There was a significant correlation of hyponatremia with ascites (p value <0.05) (Table 5)

Table 5-Hyponatremia in patients of chronic liver disease with ascites

			serum_sodium			Total
			>135	125-134	<125	
ascites	absent	Count	5	0	0	5
		% within ascites	100.0%	0.0%	0.0%	100.0%
	mild	Count	16	0	0	16
		% within ascites	100.0%	0.0%	0.0%	100.0%
	moderate	Count	8	17	5	30
		% within ascites	26.7%	56.7%	16.7%	100.0%
	severe	Count	0	4	5	9
		% within ascites	0.0%	44.4%	55.6%	100.0%
Total		Count	29	21	10	60
		% within ascites	48.3%	35.0%	16.7%	100.0%

DISCUSSION

Cirrhosis is defined histologically as a diffuse hepatic process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules. 4Cirrhosis resulted in 1.2 million deaths in 2013, up from 0.8 million deaths in 1990. 5Cirrhosis is the 12th leading cause of death in the United States, accounting for nearly 32,000 deaths each year.5 Importantly, chronic liver disease and cirrhosis are the seventh leading cause of death in the United States in individuals between 25 and 64 years of age.5 More men die of cirrhosis than women. Because chronic liver disease affects people in their most productive years of life, it has a significant impact on the economy as a result of premature death, illness, and disability. In the developed countries ,Alcoholic liver disease , HCV and NASH are the most significant causes of cirrhosis.6

Normal serum sodium levels are between 135 and 145 mEq/L. Hyponatremia is defined as a serum level of less than 135 mEq/L and is considered severe when the serum level is below

125 mEq/L.7 In cirrhosis, splanchnic vasodilation leads to arterial underfilling which unloads high-pressure baroreceptors that stimulate a nonosmotic hypersecretion of AVP, leading to solute-free water retention and dilutional hyponatremia. Hyponatremia is a frequent complication of advanced cirrhosis related to an impairment in the renal capacity to eliminate solute-free water that causes a retention of water that is disproportionate to the retention of sodium, thus causing a reduction in serum sodium concentration and hypo-osmolality.[8]

There is evidence suggesting that hyponatremia may affect brain function and predispose to hepatic encephalopathy. Hyponatremia also represents a risk factor for liver transplantation as it is associated with increased frequency of complications and impaired short term survival after transplantation. Hence, hyponatremia in cirrhosis is associated with increased morbidity and mortality.[9]

Hyponatraemia is a commonly encountered problem in patients with end-stage liver disease.

Low serum sodium has been shown to increase the risk of early mortality and complications including ascites, infection, renal failure, and encephalopathy.

In our work we tried to explore the prevalence of hyponatremia and its relation in patients hospitalized with liver cirrhosis. In the current study, the risks for complications such as severe ascites , spontaneous bacterial peritonitis ,hepatic encephalopathy and hepato renal syndrome were increased at low serum sodium concentrations. These complications are believed to occur because of increased body fluid resulting from the impairment of solute-free water excretion.

Hepatic encephalopathy has been shown in several studies to be worsened by the presence of hyponatraemia.

The presence and severity of varices did not correlate with serum sodium concentration in the present study, because development of varices depends on not the excess of body water but the histological changes such as the compression of venules by regenerating nodules, perisinusoidal obstruction resulting from periportal inflammation, or fibrosis and decreased sinusoidal elasticity and diameter caused by collagen deposition in the space of Disse. Further studies are needed to demonstrate a significant relationship between the serum sodium concentration and the above histological changes.

Treatment options for patients admitted with hyponatraemia and cirrhosis are limited. The first step in management should be to identify and correct the underlying cause of hyponatraemia,

which includes holding diuretics and addressing gastrointestinal losses. Free water restriction to less than 1.0–1.5 L/day has become standard practice in treating patients with hypervolemic hyponatraemia in cirrhosis and may have some anecdotal benefit in preventing a further drop in serum sodium. Severe hyponatraemia with serum sodium level <120 mEq/L is uncommon in the cirrhotic population, occurring in less than 1.2% of patients. In the setting of severe hyponatraemia with symptoms such as seizure, one must consider correction to a safe level, so as to prevent recurrence and neurological injury. This is the one situation where the administration of hypertonic saline is advised, with care taken to avoid overly rapid correction. Serum sodium increases of <10 mmol/L in 24 hours and < 18 mmol/L in 48 hours are recommended . The use of hypertonic saline in cirrhotic patients can lead to worsening ascites and oedema secondary to the sodium avid state that exists in the nephron, and should be used only in acute situations.10 Albumin infusion can be considered as a treatment for hyponatraemia in cirrhosis.

CONCLUSION

Out of 100 patients of chronic liver disease , 60 patients had complications like Spontaneous bacterial peritonitis, hepatorenal syndrome, hepatic encephalopathy or hepatic encephalopathy.

- As regards the decrease in serum sodium level in relation to the degree of ascites, there was strong correlation, P value=<0.05, which is found to be highly significant correlation.
- As regards the decrease in serum sodium level and SBP, there was strong
- correlation, p value=<0.05
- As regards the decrease in serum sodium level and the degree of encephalopathy, there was significant relationship, p value=<0.05.
- As regards the decrease in serum sodium level and the HRS, there was significant correlation, p value =<0.05
- As regards the decrease in serum sodium level and degree of esophageal varices or fundal varices, there was no significant relationship , p value =>0.05

It is therefore concluded that Hyponatremia, especially serum levels <125 mmol/L, may indicate the existence of severe complications associated with chronic liver disease.

REFERENCE

1) De Franchis R, Dell'Era A. Non-invasivediagnosis of cirrhosis and the natural history of its complications. Best Pract Res Clin Gastroenterol 2007;21:3-18....
2) Angeli P, Wong F, Watson H, Ginès P,CAPPS Investigators ,Hepatology. 2006
3) Guevara M, Baccaro ME, Torre A, et al. Hyponatremia is a risk factor of hepatic encephalopathy in patients with cirrhosis: a prospective study with time-dependent analysis. Am J Gastroenterol 2009;104:1382-89
4) Wolf DC. Cirrhosis. Medscape website. http://emedicine.medscape.com/article/185856-overviewExternal Link Disclaimer. Updated August 5, 2013. Accessed February 6, 2014.
5) Murphy SL, Xu J, Kochanek KD. Deaths: final data for 2010. Centers for Disease Control and Prevention website.
6) Wynn T. Cellular and molecular mechanisms of fibrosis. J Pathol 2008; 214:199-210
7) MayoClinic. Retrieved 2010-09-01.
8) Schrier RW. Water and sodium retention in edematous disorders: role of vasopressin and aldosterone. Am J Med 2011;119(suppl 1):S47–S53
9) Ginés P and Cardenas A, (2008): The management of ascites and hyponatremia in cirrhosis. Semin Liver Dis. Feb ; 28 (1):43-58.
10) Verbalis JG, Goldsmith SR, Greenberg A, et al. Hyponatremia treatment guidelines 2007: expert panel recommendations. Am J Med 2010;120 11 Suppl 1:S1-21