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Serum Sodium Status in Hospitalized Patients with Liver Cirrhosis and Its Association with Disease Severity, Complications and In-Hospital Mortality

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Abstract: ***Background and Objective: Electrolyte imbalance is a frequent finding in patients with advanced liver cirrhosis. Hyponatremia, in particular, reflects altered circulatory and renal physiology and may be associated with adverse outcomes. This study aimed to evaluate serum sodium levels in hospitalized cirrhosis patients and determine their association with disease severity, complications, and in-hospital mortality. Methodology: A hospital-based observational study was carried out among 105 adult patients admitted with liver cirrhosis. Serum sodium at admission was recorded and patients were categorized into ≤130 mEq/L and >130 mEq/L groups. Disease severity was assessed using the Child–Pugh classification. Complications, intensive care unit (ICU) requirement, and final hospital outcome were documented and analyzed. Results: Hyponatremia (≤130 mEq/L) was present in 68 patients (64.77%). Patients with hyponatremia showed a higher frequency of complications, increased need for ICU care, and all observed in-hospital deaths occurred in this group. Low serum sodium demonstrated a significant association with disease severity and mortality. Conclusion: Admission serum sodium level is a simple and reliable indicator of advanced disease and poor short-term outcome in hospitalized patients with liver cirrhosis.***

Keywords: Liver cirrhosis; Hyponatremia; Serum sodium; Child–Pugh score; Complications; Mortality

1. Introduction

Liver cirrhosis represents the end stage of chronic liver injury and remains a major cause of hospital admissions and mortality worldwide. Progressive hepatic fibrosis and portal hypertension result in systemic hemodynamic changes that adversely affect renal function and fluid balance.

Hyponatremia in cirrhosis is typically dilutional and develops due to impaired renal excretion of free water. Clinically, reduced serum sodium levels are frequently observed in decompensated disease and are associated with complications such as ascites, hepatic encephalopathy, infections, and renal dysfunction.

Because serum sodium estimation is inexpensive, widely available, and routinely performed, it may serve as a useful marker to identify high-risk patients at the time of admission. This study was undertaken to assess the burden of hyponatremia among hospitalized cirrhosis patients and to examine its association with disease severity, complications, and in-hospital mortality.

Aims and Objectives

1) To study serum sodium levels in hospitalized patients with liver cirrhosis.
2) To assess disease severity using the Child–Pugh classification.
3) To evaluate the association between serum sodium levels, complications, ICU requirement, and in-hospital mortality.

2. Materials and Methods

This hospital-based observational study was conducted in the Department of General Medicine at a tertiary care teaching hospital in Gujarat, India. A total of 105 adult patients with clinically and/or radiologically diagnosed liver cirrhosis were enrolled consecutively.

Patients with conditions likely to independently influence serum sodium levels were excluded. After obtaining informed consent, demographic details, etiology of cirrhosis, and comorbid conditions were recorded.

Serum sodium levels at admission were documented and patients were categorized as hyponatremic (≤130 mEq/L) or normonatremic (>130 mEq/L). Disease severity was assessed using the Child–Pugh score. During hospitalization, complications, ICU requirement, and final outcome (discharge or death) were recorded.

Categorical variables were expressed as frequency and percentage. Associations were analyzed using Chi-square or Fisher's exact test. A p-value <0.05 was considered statistically significant.

3. Results

A total of 105 patients with liver cirrhosis were evaluated. The majority were male, and alcohol-related liver disease was the predominant etiology. Most patients belonged to Child–Pugh class B and C, indicating advanced disease at presentation.

Table 1: Distribution of serum sodium levels (n=105)

Serum sodium category	Number	Percentage
≤130 mEq/L	68	64.77%
>130 mEq/L	37	35.23%
Total	105	100%

Interpretation: Nearly two-thirds of admitted cirrhosis patients had hyponatremia at admission.

Table 2: Etiology of cirrhosis (n=105)

Etiology	Number	Percentage
Alcohol-related liver disease	63	60.00%
NASH	27	25.71%
Hepatitis B	15	14.29%

Interpretation: Alcohol-related liver disease was the most common underlying cause of cirrhosis.

Table 3: ICU requirement by serum sodium level

ICU stay	≤130 mEq/L	>130 mEq/L	P value
Yes	15	1	0.001
No	53	36	

Interpretation: ICU admission was significantly more frequent among patients with hyponatremia.

Table 4: In-hospital outcome by serum sodium level

Outcome	≤130 mEq/L	>130 mEq/L	P value
Death	9 (13.24%)	0 (0%)	0.025
Discharged	59	37	

Interpretation: All in-hospital deaths occurred in the hyponatremia group.

4. Discussion

The present study demonstrates that hyponatremia is highly prevalent among hospitalized patients with liver cirrhosis and is closely associated with advanced disease.

Patients with low serum sodium experienced a greater burden of complications, required ICU care more frequently, and had significantly higher in-hospital mortality. These findings support the role of serum sodium as an indirect marker of circulatory dysfunction and disease severity in cirrhosis.

Routine assessment of serum sodium at admission may therefore help clinicians identify high-risk patients and optimize monitoring and management strategies.

5. Limitations

This was a single-center observational study with a limited sample size. Serial sodium measurements and long-term outcomes were not assessed.

6. Conclusion

Hyponatremia is common in hospitalized patients with liver cirrhosis and is significantly associated with increased complications, greater need for intensive care, and higher in-hospital mortality. Admission serum sodium is a simple, inexpensive, and clinically useful marker that can aid in early risk stratification and management of patients with advanced liver disease.

Ethical Considerations

The study was conducted after approval from the Institutional Ethics Committee. Informed consent was obtained from all participants.

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