Section: General Medicine

Original Research Article

A CORRELATIVE STUDY OF SERUM PROLACTIN LEVELS WITH THE SEVERITY OF CHRONIC LIVER DISEASE AT A TERTIARY CARE HOSPITAL IN NORTH KARNATAKA

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ABSTRACT

Background: Chronic liver disease (CLD) is associated with various hormonal derangements, including hyperprolactinemia. The relationship between serum prolactin levels and disease severity in CLD patients remains inadequately explored in the North Karnataka population. **Objectives:** To correlate serum prolactin levels with Child-Pugh score and MELD score in patients with chronic liver disease.

Materials and Methods: This cross-sectional study was conducted at the Department of General Medicine, KIMS Teaching Hospital, Koppal, from August 2024 to July 2025. Sixty-one patients with chronic liver disease were enrolled. Serum prolactin levels, Child-Pugh score, and MELD score were recorded. Spearman's correlation coefficient was used for statistical analysis. A p-value <0.05 was considered significant.

Results: The mean age was 45.69 ± 10.94 years with male predominance (88.5%). Alcoholic liver disease was the most common etiology (90.2%). Mean serum prolactin was 21.64 ± 22.64 ng/mL, with 44.3% showing elevated levels. Majority belonged to Child-Pugh Class C (68.9%). Serum prolactin showed weak positive correlations with Child-Pugh score ($\rho = +0.115$, $p = 0.377$) and MELD score ($\rho = +0.189$, $p = 0.144$), which were not statistically significant. However, serum prolactin showed significant positive correlation with INR ($\rho = +0.310$, $p = 0.015$).

Conclusion: Serum prolactin levels were elevated in CLD patients but did not show significant correlation with Child-Pugh or MELD scores. The significant correlation with INR suggests association with synthetic liver dysfunction.

Keywords: Chronic liver disease, Serum prolactin, Child-Pugh score, MELD score, Liver cirrhosis.

INTRODUCTION

Chronic liver disease (CLD) is a major global health burden. India contributes significantly to this burden, accounting for 18.3% of all cirrhosis deaths globally.[1] Liver disease ranks as the tenth most common cause of death in India, with an estimated death rate of 2.21 per 100,000 population.[2] A recent meta-analysis reported that alcohol is the most common cause of cirrhosis in Indian adults (43.2%), followed by non-alcoholic fatty liver disease (14.4%) and hepatitis B (11.5%).[3] Notably, the proportion of alcohol-related cirrhosis has increased significantly over the past three decades.

Chronic liver diseases are associated with various hormonal derangements, including hyperprolactinemia.[4] Prolactin secretion is tonically inhibited by hypothalamic dopaminergic pathways. In cirrhosis, hyperprolactinemia occurs through multiple mechanisms: suppression of dopaminergic pathways due to hyperestrogenemia, increased false

neurotransmitters from aromatic amino acids, and reduced hepatic clearance of prolactin.[5,6]

The Child-Pugh score and MELD score are standard tools for assessing CLD severity. However, additional biomarkers are being investigated to complement these scores.[7] Several studies have reported correlations between serum prolactin and disease severity in cirrhosis, though results remain inconsistent.[8,9] Some studies found significant positive correlations, while others reported that hyperprolactinemia in cirrhosis may be confounded by medications or comorbidities.[10]

Need for the Study

There is a paucity of data regarding serum prolactin levels in CLD patients from North Karnataka. This region has a high prevalence of alcoholic liver disease, yet no studies have evaluated prolactin as a potential marker of disease severity in this population. Given the increasing burden of CLD in India and the need for simple, cost-effective biomarkers, this study was undertaken to investigate the correlation between serum prolactin levels and the severity of chronic liver disease in our setup.

Aims and Objectives

- To estimate serum prolactin levels in patients with chronic liver disease
- To correlate serum prolactin levels with Child-Pugh score
- To correlate serum prolactin levels with MELD score
- To evaluate the association of serum prolactin with clinical and laboratory parameters in CLD

MATERIALS AND METHODS

Study Design: Cross-sectional observational study

Study Setting: Department of General Medicine, KIMS Teaching Hospital, Koppal, Karnataka

Study Duration: 12 months (August 2024 to July 2025)

Sample Size: 61 patients (calculated using formula $n = z^2 \times p \times q / l^2$ with $p = 0.20$, $z = 1.96$, $l = 0.10$)

Inclusion Criteria

- Patients diagnosed with chronic liver disease
- Age more than 18 years
- Admitted at KIMS Teaching Hospital, Koppal

Exclusion Criteria

- Chronic renal failure
- Medications known to increase serum prolactin levels
- Pregnancy and lactation
- History of cranial surgery or irradiation
- Seizure disorder
- Known pituitary or hypothalamic disease

Methodology

After obtaining informed consent, detailed history and clinical examination were performed. Laboratory investigations including complete blood count, liver function tests, renal function tests, PT/INR, and serum prolactin (electrochemiluminescence assay) were performed. Child-Pugh score and MELD score were calculated.

Statistical Analysis

Data was analyzed using SPSS version 22. Continuous variables were expressed as mean ± SD and median (IQR). Spearman's correlation coefficient was used for correlations. Kruskal-Wallis test was used for comparison across groups. P-value <0.05 was considered significant.

Ethical Approval: Obtained from Institutional Ethics Committee, KIMS, Koppal.

RESULTS

A total of 61 patients with chronic liver disease were enrolled in the study.

Table 1: Demographic, Etiological, and Clinical Characteristics of Study Population

Parameter	Category	n (%)
Age (years)	Mean ± SD	45.69 ± 10.94
	≤30	1 (1.6)
	31-40	23 (37.7)
	41-50	22 (36.1)
	51-60	7 (11.5)
	>60	8 (13.1)
Gender	Male	54 (88.5)
	Female	7 (11.5)
Etiology	Alcoholic	55 (90.2)
	Hepatitis B	3 (4.9)
	Cryptogenic	3 (4.9)
Ascites	Present	58 (95.1)
	- Gross	26 (42.6)
	- Moderate	24 (39.3)
	- Mild	8 (13.1)
	Absent	3 (4.9)
Hepatic Encephalopathy	Present	28 (45.9)
	- Grade 1	4 (6.6)
	- Grade 2	14 (23.0)
	- Grade 3	8 (13.1)
	- Grade 4	2 (3.3)

	Absent	33 (54.1)
Jaundice	Present	44 (72.1)
	Absent	17 (27.9)
Pedal Edema	Present	60 (98.4)
	Absent	1 (1.6)

Table 2: Baseline Hematological Parameters and Prognostic Risk Classification (N=67)

Parameter	Mean ± SD	Median (IQR)	Range
Serum Bilirubin (mg/dL)	7.80 ± 8.76	4.40 (1.60-8.90)	0.60-31.00
AST (IU/L)	95.74 ± 58.43	91.00 (46.00-130.00)	16.00-264.00
ALT (IU/L)	87.52 ± 52.74	76.00 (43.00-110.00)	21.00-248.00
ALP (IU/L)	155.39 ± 75.04	135.00 (106.00-172.00)	59.00-434.00
Serum Albumin (g/dL)	2.94 ± 0.35	3.00 (2.70-3.10)	2.00-3.80
INR	1.46 ± 0.48	1.40 (1.20-1.50)	1.00-4.10
Serum Creatinine (mg/dL)	1.30 ± 1.21	1.00 (0.60-1.50)	0.20-7.90
Platelet Count (×10⁹/L)	129.05 ± 98.80	102.00 (74.00-135.00)	36.00-615.00
Serum Prolactin (ng/mL)	**21.64 ± 22.64**	**16.83 (13.74-21.52)**	**6.43-171.37**
Child-Pugh Score	**10.15 ± 1.72**	**10.0 (9.0-11.0)**	**6-13**
MELD Score	**18.28 ± 6.99**	**18.0 (13.0-22.0)**	**6-37**

Table 3: Distribution According to Child-Pugh Class and MELD Categories

Disease Severity Parameter	Category	n (%)
Child-Pugh Class	Class A (5-6)	1 (1.6)
	Class B (7-9)	18 (29.5)
	Class C (10-15)	42 (68.9)
MELD Score	<10	6 (9.8)
	10-19	31 (50.8)
	20-29	19 (31.1)
	≥30	5 (8.2)
Serum Prolactin Status	Elevated	27 (44.3)
	Normal	34 (55.7)

Table 4: Serum Prolactin Levels Across Child-Pugh Classes and Clinical Features

Parameter	Category	n	Mean ± SD (ng/mL)	p-value
Child-Pugh Class	Class A	1	18.70	0.714
	Class B	18	18.09 ± 9.89	
	Class C	42	23.23 ± 26.48	
Hepatic Encephalopathy	Present	28	21.63 ± 14.45	0.120
	Absent	33	21.65 ± 28.01	
Jaundice	Present	44	22.08 ± 25.80	0.641
	Absent	17	20.50 ± 11.44	
Ascites	Absent	3	12.61 ± 6.14	0.580
	Mild	8	17.95 ± 4.71	
	Moderate	24	18.46 ± 7.64	
	Gross	26	26.75 ± 33.41	

Table 5: Correlation of Serum Prolactin with Disease Severity Scores

Variable	Spearman ρ	p-value	Significance
Child-Pugh Score	+0.115	0.377	Not significant
MELD Score	+0.189	0.144	Not significant

Table 6: Correlation of Serum Prolactin with Laboratory Parameters

Parameter	Spearman ρ	p-value	Significance
Serum Bilirubin	+0.125	0.339	No
AST	+0.164	0.206	No
ALT	+0.132	0.312	No
ALP	+0.065	0.620	No
Serum Albumin	-0.035	0.791	No
INR	**+0.310**	**0.015**	**Yes**
Platelet Count	-0.137	0.291	No

DISCUSSION

This study evaluated the correlation between serum prolactin levels and CLD severity in 61 patients from North Karnataka. The mean age was 45.69 ± 10.94 years with marked male predominance (88.5%), consistent with studies by Balakrishnan et al.[8] and Bhattacharyya et al,[11] Alcoholic liver disease was the predominant etiology (90.2%), higher than the national pooled estimate of 43.2%, reflecting regional patterns of alcohol consumption in North Karnataka.[3]

Mean serum prolactin was 21.64 ± 22.64 ng/mL, with 44.3% showing elevated levels. This is comparable to findings by Mukherjee et al,[9] who reported elevated

prolactin in 48% of cirrhotic patients. The majority belonged to Child-Pugh Class C (68.9%), reflecting the tertiary care setting.

The primary finding was that serum prolactin showed weak positive correlations with Child-Pugh score ($\rho = +0.115$, $p = 0.377$) and MELD score ($\rho = +0.189$, $p = 0.144$), which were not statistically significant. This contrasts with studies by Balakrishnan et al,[8] ($r = 0.43$, $p < 0.001$) and Singh et al,[7] who reported significant correlations. However, our findings align with Ress et al,[10] who found that in the absence of confounding factors, marked hyperprolactinemia was uncommon in cirrhosis.

The discrepancy may be attributed to the skewed distribution toward Class C (68.9%), the predominantly alcoholic etiology, and wide variability in prolactin levels (SD = 22.64 ng/mL). Importantly, serum prolactin showed a significant positive correlation with INR ($\rho = +0.310$, $p = 0.015$), suggesting association with synthetic liver dysfunction rather than overall disease severity scores.

Limitations: Cross-sectional design, skewed distribution toward advanced disease, and predominantly alcoholic etiology limiting generalizability.

CONCLUSION

Serum prolactin levels were elevated in 44.3% of CLD patients in this North Karnataka cohort, but did not demonstrate statistically significant correlation with Child-Pugh score or MELD score. However, the significant positive correlation with INR ($\rho = +0.310$, $p = 0.015$) suggests that prolactin may be associated with hepatocellular synthetic dysfunction. The role of serum prolactin as a prognostic marker in CLD remains inconclusive, and larger multicentric studies with balanced distribution across disease severity categories are warranted before recommending its routine clinical use.

Conflicts of Interest: None declared.
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