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Original Research Article

Etiology, Clinical Profile and Complications of Liver Cirrhosis: A Hospital-Based Cross-Sectional Study

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Abstract:

Background: Liver cirrhosis is a major cause of morbidity and mortality and often presents late with life-threatening complications. Data on the current etiological pattern and clinical profile of cirrhosis from tertiary care centers in India remain limited.

Aim: To evaluate the etiology, clinical profile, complications, severity, and in-hospital outcomes of patients with liver cirrhosis.

Materials and Methods: This hospital-based cross-sectional study included 200 adult patients with cirrhosis diagnosed on clinical and ultrasonographic criteria. Clinical features, laboratory parameters, ultrasonography, and upper gastrointestinal endoscopy findings were recorded. Disease severity was assessed using the Child–Turcotte–Pugh score.

Results: The majority were males (72.5%), with alcohol being the most common etiology (61%). Ascites (66%) and gastroesophageal varices (43%) were the most frequent complications. Most patients presented with advanced disease, with 54% in Child-Pugh Class C. The in-hospital mortality rate was 18%.

Conclusion: Alcohol remains the leading cause of cirrhosis, with most patients presenting in advanced stages and experiencing significant complications. Early diagnosis and preventive strategies are essential to improve outcomes.

Keywords: Liver, Cirrhosis, Alcohol, Hepatitis.

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Introduction

Liver cirrhosis represents the final common pathological pathway of a wide spectrum of chronic liver diseases and is characterized by diffuse hepatic fibrosis, regenerative nodule formation, and distortion of normal hepatic architecture, ultimately leading to portal hypertension and hepatic insufficiency [1]. Cirrhosis is a major global health problem and contributes significantly to morbidity, mortality, and healthcare burden worldwide.

According to global estimates, cirrhosis and its complications account for more than one million deaths annually, ranking among the leading causes of death in adults, particularly in low- and middle-income countries [2,3]. Clinically, liver cirrhosis may remain asymptomatic for prolonged periods until the onset of decompensation, which marks a critical transition in disease course and prognosis. Decompensated cirrhosis is associated with life-threatening complications such as ascites, variceal gastrointestinal bleeding, hepatic encephalopathy, spontaneous bacterial peritonitis, hepatorenal syndrome, and hepatocellular carcinoma [4,5]. The occurrence of these complications reflects disease severity and is associated with a sharp decline in survival, increased hospitalizations, and poor quality of life [6].

The etiology of cirrhosis shows considerable geographic and temporal variation. While alcohol-related liver disease and chronic viral hepatitis remain dominant causes globally, recent years have witnessed a rising contribution of non-alcoholic

fatty liver disease and non-alcoholic steatohepatitis, particularly in developing countries undergoing epidemiological transition [7,8]. In India, alcohol consumption, hepatitis B infection, and metabolic risk factors contribute variably to the burden of cirrhosis, with patients often presenting at advanced stages due to delayed diagnosis, limited access to healthcare, and poor disease awareness [9,10].

Assessment of disease severity and prognosis in cirrhosis relies on validated scoring systems such as the Child–Turcotte–Pugh score and the Model for End-Stage Liver Disease (MELD) score, which correlate with the risk of complications and mortality [11,12]. Understanding the clinical profile, etiological distribution, and spectrum of complications among hospitalized cirrhotic patients is essential for early identification of high-risk individuals, optimal resource allocation, and formulation of preventive and therapeutic strategies.

Despite the significant burden of chronic liver disease in India, contemporary data describing the etiology, clinical manifestations, complications, and outcomes of cirrhosis in hospitalized patients remain limited, particularly from tertiary care settings. Regional variations in etiological factors and complication patterns further necessitate institution-specific data. Hence, the present study was undertaken to evaluate the etiology, clinical profile, spectrum of complications, severity, and short-term outcomes of patients with liver cirrhosis admitted to a tertiary care hospital.

Materials and Methods

Study Design and Setting: This was a hospital-based, cross-sectional observational study conducted in the Department of Gastroenterology at Mahatma Gandhi Medical College, Jaipur, a tertiary care teaching hospital in India.

Study Period: The study was conducted over a period of 6 months, from July 2025 to December 2025.

Study Population: A total of 200 consecutive patients diagnosed with liver cirrhosis and admitted to the medical wards during the study period were included in the study.

Inclusion Criteria

- Patients aged ≥18 years
- Patients diagnosed with liver cirrhosis based on clinical features and ultrasonographic evidence
- Patients who provided informed consent to participate in the study

Exclusion Criteria

- Patients with acute liver failure
- Patients with a history of liver transplantation
- Patients with incomplete clinical or laboratory data
- Patients unwilling to participate in the study

Diagnostic Criteria for Liver Cirrhosis: The diagnosis of liver cirrhosis was established based on ultrasonographic findings, which included features such as:

- Coarse and heterogeneous hepatic echotexture
- Irregular or nodular liver surface
- Altered liver size
- Associated features of portal hypertension such as splenomegaly, ascites, and portosystemic collaterals

Data Collection: Detailed clinical data were collected using a structured proforma. This included demographic details, alcohol consumption history, comorbid conditions, presenting symptoms, and physical examination findings.

All patients underwent routine laboratory investigations, including complete blood count, liver function tests, renal function tests, serum electrolytes, and coagulation profile. Upper gastrointestinal endoscopy was performed, where feasible, to evaluate for the presence of gastroesophageal varices and portal hypertensive gastropathy.

Patients with ascites underwent diagnostic paracentesis, and ascitic fluid analysis was performed for cell count, differential count, serum–ascites albumin gradient, and culture where indicated.

Definitions of Complications

- Ascites was diagnosed clinically and/or by ultrasonography.
- Hepatic encephalopathy was diagnosed and graded according to the West Haven criteria.
- Spontaneous bacterial peritonitis was diagnosed when the ascitic fluid polymorphonuclear leukocyte count was ≥250 cells/mm³ in the absence of an intra-abdominal source of infection.
- Hyponatremia was defined as a serum sodium concentration <130 mEq/L.
- Coagulopathy was defined by a prolonged prothrombin time and/or international normalized ratio above normal limits.
- Hepatorenal syndrome was diagnosed based on standard clinical and laboratory criteria.

Severity Assessment: Severity of liver disease was assessed using the Child–Turcotte–Pugh (CTP) score, calculated based on serum bilirubin, serum albumin, prothrombin time/international normalized ratio, presence of ascites, and degree of hepatic encephalopathy. Patients were categorized into Child-Pugh class A, B, or C accordingly.

Outcome Measures: Primary outcome measures included the etiology, clinical profile, and spectrum of complications of liver cirrhosis. Secondary outcomes included in-hospital mortality and length of hospital stay.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages.

Results

A total of 200 patients diagnosed with liver cirrhosis were included in the present study.

Demographic Characteristics: The age of the patients ranged from less than 30 years to more than 60 years. The majority of patients belonged to the ≥60 years age group (70 patients, 35%), followed by the 50–59 years age group (68 patients, 34%). Forty-five patients (22.5%) were in the 40–49 years age group, while only 17 patients (8.5%) were below 40 years of age. There was a marked male predominance, with 145 males (72.5%) and 55 females (27.5%).

Etiology of Liver Cirrhosis: Alcohol-related liver disease was the most common etiology, observed in 122 patients (61%). Viral hepatitis accounted for a significant proportion, with hepatitis B in 21 patients (10.5%) and hepatitis C in 11 patients (5.5%). A combined etiology of alcohol and viral hepatitis was seen in 10 patients (5%). Non-alcoholic steatohepatitis was identified in 27 patients (13.5%). Cryptogenic cirrhosis accounted for 5 patients (2.5%), while autoimmune hepatitis and Wilson's disease were noted in 3 (1.5%) and 1 (0.5%) patient respectively.

Clinical Features at Presentation: The most common presenting symptom was easy fatigability, reported in 138 patients (69%), followed by abdominal distension due to ascites in 108 patients (54%). Jaundice and anorexia were present in 74 (37%) and 72 (36%) patients respectively. Upper gastrointestinal bleeding was noted in 34 patients (17%), while 22 patients (11%) presented with altered sensorium suggestive of hepatic encephalopathy. Pain abdomen and fever were reported in 18 (9%) and 14 (7%) patients respectively. Only 6 patients (3%) were asymptomatic at presentation.

Physical Examination Findings: On clinical examination, pallor was the most common finding, present in 98 patients (49%), followed by ascites in 104 patients (52%) and splenomegaly in 94 patients (47%). Icterus was observed in 68 patients (34%), while pedal edema was noted in 62 patients (31%). Hepatomegaly was present in 32 patients (16%), and asterixis was detected in 18 patients (9%).

Laboratory Abnormalities: Laboratory evaluation revealed thrombocytopenia (platelet count <150,000/mm³) in 142 patients (71%) and coagulopathy in 109 patients (54.5%). Anemia (hemoglobin <10 g/dL) was present in 86 patients (43%). Elevated serum bilirubin levels (>2 mg/dL) were seen in 68 patients (34%), while hypoalbuminemia (<3 g/dL) was noted in 56 patients (28%). Renal dysfunction, defined as serum creatinine >1.5 mg/dL, was observed in 32 patients (16%). Hyponatremia (serum sodium <130 mEq/L) was present in 45 patients (22.5%).

Ultrasonographic Findings: Ultrasonography revealed coarse or nodular liver echotexture in 184 patients (92%). Features of portal hypertension were common, with portal vein dilatation in 168 patients (84%), splenomegaly in 126 patients (63%), and ascites in 132 patients (66%). Portosystemic collaterals were identified in 102 patients (51%). Hepatic focal lesions suggestive of hepatocellular carcinoma were detected in 8 patients (4%).

Upper Gastrointestinal Endoscopy Findings: Upper gastrointestinal endoscopy was performed where feasible. Gastroesophageal varices were detected in 86 patients (43%), of which 34 patients (17%) had large varices and 52 patients (26%) had small varices. Portal hypertensive gastropathy was noted in 30 patients (15%). A normal endoscopic study was observed in 108 patients (54%).

Complications of Liver Cirrhosis: Ascites was the most common complication, observed in 132 patients (66%). Gastroesophageal varices were present in 86 patients (43%), while hepatic encephalopathy was documented in 22 patients (11%). Spontaneous bacterial peritonitis was diagnosed in 18 patients (9%). Hyponatremia and coagulopathy were noted in 45 (22.5%) and 109 (54.5%) patients respectively. Hepatorenal syndrome was seen in 28 patients (14%), and hepatocellular carcinoma was identified in 5 patients (2.5%).

Severity Assessment: Based on the Child–Turcotte–Pugh classification, 16 patients (8%) were categorized as Class A, 76 patients (38%) as Class B, and the majority, 108 patients (54%), belonged to Class C, indicating advanced liver disease at presentation.

Hospital Outcome: During hospital stay, 142 patients (71%) were discharged after improvement. Thirty-six patients (18%) died during hospitalization, while 22 patients (11%) left against medical advice.

Table 1: Etiology of liver cirrhosis (n = 200)

Etiology	Number of patients	Percentage (%)
Alcohol related	122	61.0
Hepatitis B	21	10.5
Hepatitis C	11	5.5
Alcohol + viral hepatitis	10	5.0
Non-alcoholic steatohepatitis (NASH)	27	13.5
Autoimmune hepatitis	3	1.5
Wilson's disease	1	0.5
Cryptogenic	5	2.5
Total	200	100

Table 2: Upper gastrointestinal endoscopy findings

Endoscopic finding	Number of patients	Percentage (%)
Gastroesophageal varices (any)	86	43.0
Large varices	34	17.0
Small varices	52	26.0
Portal hypertensive gastropathy	30	15.0
Normal endoscopy	108	54.0

Note: Percentages calculated out of total study population.

Table 3: Complications of liver cirrhosis

Complication	Number of patients	Percentage (%)
Ascites	132	66.0
Gastroesophageal varices	86	43.0
Hepatic encephalopathy	22	11.0
Spontaneous bacterial peritonitis	18	9.0
Hyponatremia	45	22.5
Hepatorenal syndrome	28	14.0
Coagulopathy	109	54.5
Hepatocellular carcinoma	5	2.5

Table 4: Clinical symptoms at presentation

Symptom	Number of patients	Percentage (%)
Easy fatigability	138	69.0
Abdominal distension (ascites)	108	54.0
Jaundice	74	37.0
Anorexia	72	36.0
Upper gastrointestinal bleeding	34	17.0
Altered sensorium	22	11.0
Pain abdomen	18	9.0
Fever	14	7.0
Asymptomatic	6	3.0

Table 5: Child–Turcotte–Pugh status

Child-Pugh class	Number	Percentage
Class A	16	8%
Class B	76	38%
Class C	108	54%

Discussion

In the present hospital-based cross-sectional study of 200 patients with liver cirrhosis, alcohol was identified as the most common etiological factor, and the majority of patients presented with decompensated disease characterized by ascites, portal hypertension, and advanced Child–Turcotte–Pugh (CTP) class. A significant proportion of patients had multiple complications at presentation, and in-hospital mortality remained high, reflecting late diagnosis and advanced disease stage at admission.

Alcohol-related liver disease accounted for 61% of cases in the present study, making it the predominant etiology. This finding is consistent with several Indian and regional studies, where alcohol continues to be the leading cause of cirrhosis among hospitalized patients [9,10]. Chronic hepatitis B and C together contributed to approximately one-fifth of cases, similar to

previously reported Indian data [9]. Notably, non-alcoholic steatohepatitis accounted for 13.5% of cirrhosis cases, highlighting the growing burden of metabolic liver disease. This trend mirrors global observations and has been attributed to increasing prevalence of obesity, diabetes mellitus, and metabolic syndrome [7,8]. Ascites was the most common complication observed in the present study, affecting 66% of patients, followed by gastroesophageal varices in 43% and hepatic encephalopathy in 11%. These findings are comparable to earlier studies, which have reported ascites as the most frequent manifestation of decompensated cirrhosis [4,5]. Spontaneous bacterial peritonitis was diagnosed in 9% of patients with ascites, a prevalence similar to that reported in other hospital-based studies [13].

Upper gastrointestinal endoscopy revealed gastroesophageal varices in 43% of patients, with large varices present in 17%. Portal hypertensive gastropathy was noted in 15% of patients. These findings underscore the high burden of portal hypertension in cirrhotic patients and emphasize the importance of early endoscopic screening to prevent life-threatening gastrointestinal bleeding [14]. Assessment of disease severity using the Child–Turcotte–Pugh classification showed that more than half of the patients (54%) belonged to CTP Class C, indicating advanced disease at presentation. Similar observations have been reported from other tertiary care centers in India, reflecting delayed presentation and referral [15]. The in-hospital mortality rate of 18% observed in the present study is comparable to previously reported data and highlights the poor prognosis associated with decompensated cirrhosis [3].

Limitations

The present study has certain limitations. Being a single-center, hospital-based study, the findings may not be generalizable to the community at large. The cross-sectional design limited the assessment of long-term outcomes and survival. Diagnosis of cirrhosis was based on clinical and ultrasonographic findings, and histopathological confirmation was not performed. Additionally, the study included only hospitalized patients, which may have resulted in over-representation of advanced and decompensated disease.

Conclusion

Alcohol remains the leading cause of liver cirrhosis, with an increasing contribution from non-alcoholic steatohepatitis. Most patients present with advanced disease and multiple complications, resulting in significant in-hospital mortality. Early detection of chronic liver disease, timely screening for complications, and focused preventive strategies addressing alcohol use and metabolic risk factors are essential to reduce the burden of cirrhosis and improve patient outcomes.

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