



ASSESSMENT OF CARDIOVASCULAR DYSFUNCTION IN CIRRHOSIS OF LIVER IN REFERENCE TO CHILD-PUGH SCORE: A CROSS-SECTIONAL OBSERVATIONAL STUDY

General Medicine

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ABSTRACT

Background: Cirrhosis of the liver is associated with significant hemodynamic and structural cardiovascular changes including reduced systemic vascular resistance, increased arterial compliance, and latent or overt cardiac dysfunction. Diastolic dysfunction, in particular, is an independent predictor of mortality in cirrhosis. Despite this, cardiovascular evaluation in cirrhosis remains under-investigated. **Objective:** To assess cardiovascular dysfunction in cirrhosis of liver in correlation with Child-Pugh Score. **Methods:** This observational cross-sectional study included 50 adult cirrhotic patients. Clinical, biochemical, and radiological criteria were used to confirm cirrhosis. Cardiac evaluation was performed using ECG and 2D echocardiography. The severity of cirrhosis was stratified using the Child-Pugh classification. Statistical analysis included percentages and proportions. **Results:** Majority of patients were male (82%), aged 31–60 years (66%). The predominant etiology was alcohol (70%). Diastolic dysfunction was observed in 35% (Child B) and 40.7% (Child C) patients. QTc prolongation and RV strain pattern increased with severity. Moderate-to-severe systolic dysfunction and pulmonary hypertension were only seen in Child C group. **Conclusion:** Cardiovascular dysfunction, including diastolic and systolic dysfunction, QTc prolongation, and pulmonary hypertension, progressively correlate with worsening liver disease severity as per Child-Pugh classification. Early cardiovascular evaluation should be emphasized in advanced cirrhosis to improve prognosis.

KEYWORDS

Cirrhosis, Cardiovascular Dysfunction, Diastolic Dysfunction, Child-pugh Score, Cirrhotic Cardiomyopathy, Echocardiography, QTc Prolongation

INTRODUCTION

Cirrhosis of the liver is a chronic progressive disease characterized by fibrosis and nodular regeneration, leading to architectural distortion and portal hypertension. It is associated with systemic circulatory changes including reduced systemic vascular resistance, increased arterial compliance, and impaired cardiac contractility, often termed cirrhotic cardiomyopathy.

Diastolic dysfunction in particular has emerged as a strong predictor of mortality in cirrhotic patients. However, comprehensive evaluation of cardiovascular function in cirrhosis, especially in relation to liver disease severity, remains limited in literature.

This study aims to assess the prevalence and pattern of cardiovascular dysfunction in cirrhotic patients and its correlation with the Child-Pugh Score, a standard tool for cirrhosis severity stratification.

METHODS

Study Design

Type: Observational, cross-sectional study

Setting: Department of Medicine, [Amaltas Institute of medical sciences], over a 1-year period.

Study Population

Sample Size: 50 patients (calculated using Slovin's formula)

Inclusion Criteria

- Age >18 years
- Clinically, biochemically, and radiologically diagnosed cirrhosis
- Either sex

Exclusion Criteria

- Known pre-existing cardiac disease
- Age <18 years

Ethical Consideration

Informed written and verbal consent was obtained.

Study approved by Institutional Ethics Committee (IEC).

Diagnosis of Cirrhosis

Clinical Criteria:

- Reduced liver span <8 cm
- Splenomegaly

Ascites

Biochemical Criteria:

- Prolonged PT >12 seconds
- Serum albumin <3.5 g/dL

Radiological (USG)

- Shrunk liver (<8 cm mid-clavicular line)
- Portal vein diameter >1.3 cm
- Splenomegaly (>13 cm)

Cardiac Assessment

ECG – For rhythm abnormalities, QTc interval, RV strain

2D Echocardiography –

LV Hypertrophy

Diastolic dysfunction (Grade 1)

Systolic dysfunction (EF-based classification)

Pulmonary artery hypertension (PAH)

Tricuspid regurgitation

Statistical Analysis

Data analyzed using descriptive statistics: frequencies, percentages. Represented in tabular and graphical form.

RESULTS

Demographics & Etiology

Parameter	Value
Males	41 (82%)
Females	9 (18%)
Age 31–60 years	33 (66%)
Etiology – Alcohol	35 (70%)
Viral Hepatitis	5 (10%)
Undiagnosed	10 (20%)

Child-Pugh Class Distribution

- Class A: 3 patients (6%)
- Class B: 20 patients (40%)
- Class C: 27 patients (54%)

ECG Findings Across Child-Pugh Class

Finding	Class A (n=3)	Class B (n=20)	Class C (n=27)
Sinus Tachycardia	2 (66.6%)	10 (50%)	14 (51.8%)
QTc Prolongation	0	4 (20%)	8 (29.6%)
RV Strain Pattern	0	4 (20%)	6 (22.2%)

Echocardiographic Findings

Parameter	Class A	Class B	Class C
Tricuspid Regurgitation	0	6 (30%)	8 (29.6%)
Concentric LVH	0	3 (15%)	4 (14.8%)
Diastolic Dysfunction	0	7 (35%)	11 (40.7%)
Mild PAH	0	0	5 (18.5%)
Moderate PAH	0	0	1 (3.7%)
Mild Systolic Dysfunction (EF 40-49%)	0	1 (5%)	0
Moderate Systolic Dysfunction (EF 31-39%)	0	1 (5%)	3 (11.1%)
Severe Systolic Dysfunction (EF ≤30%)	0	2 (10%)	4 (14.8%)

DISCUSSION

Our findings support the progressive increase in cardiovascular dysfunction with increasing severity of liver cirrhosis, consistent with previous literature: Genovesi S. et al. found QTc prolongation strongly correlated with worsening Child-Pugh class.

Alqahtani SA et al. highlighted the paradox of increased resting cardiac output with inadequate stress response in cirrhosis.

Ruiz.del.Árbol L et al. demonstrated that LV diastolic dysfunction (LVDD) is a reliable marker of poor prognosis and linked to type 1 hepatorenal syndrome.

Our study reinforces that Child-Pugh class C patients exhibit higher rates of diastolic dysfunction, PAH, and reduced EF, making cardiovascular evaluation vital for risk stratification.

CONCLUSION

Cardiac dysfunction is a frequent and under-recognized complication in cirrhotic patients. Our study confirms that: QTc prolongation, diastolic and systolic dysfunction, and pulmonary hypertension increase with Child-Pugh severity.

Routine cardiovascular screening, particularly 2D echocardiography, should be considered standard in moderate-to-severe cirrhosis for early detection and risk mitigation.

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