

## Prevalence of Diastolic Dysfunction and Severity of Liver Cirrhosis

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**Introduction:** The presence of cirrhotic cardiomyopathy, which includes a left ventricular diastolic dysfunction (DD), seems to deteriorate the course of liver cirrhosis and the prognosis. The prevalence of DD in cirrhotic patients averages about 50%. It can be evaluated by Doppler echocardiography. There seems to be a relation between DD and the severity of liver dysfunction. In this study, we evaluated the association between diastolic dysfunction and severity of liver cirrhosis.

**Methods:** We enrolled 250 Cirrhotic patients, either admitted in our hospital or followed as out-patients, from January 2016 to March 2018. Diagnosis of cirrhosis was established through combination of clinical, biochemical and imaging findings. Severity of cirrhosis was evaluated by Child-Pugh score. Echocardiographic studies were performed by expert cardiologist.  $P$  value  $< 0.05$  was considered significant. Exclusion criteria were: 1) Evidence of cardiovascular disease, respiratory disease, renal disease or any other major systemic disease. 2) Cardiac arrhythmias (3) Recent bleeding ( $< 3$  months) (3) Hemoglobin  $< 9$  gm/dl (4) Serum creatinine  $> 1.5$  mg/dl (5) Patients with systemic hypertension and diabetes mellitus (6) Age  $< 25$  years and  $> 65$  years.

**Results:** 210 (84%) patients were male and 40 (16%) were female. The mean age of patients was  $52.78 \pm 15.2$  years. 55 (22%), 95 (38%) and 100 (40%) of patients were considered as child class A, B, and C, respectively. Of 250 patients 109 (43.6%), 73 (29.2%), 32 (12.8%) were having Mild, Moderate, severe diastolic dysfunction respectively with 36 (14.4%) being normal LV function. There was a significant relation between diastolic dysfunction and disease duration ( $P < 0.001$ ) and severity of cirrhosis ( $P < 0.048$ ). On multivariate analysis, decreased E/A ratio ( $P = 0.03$ ) and disease duration ( $P = 0.02$ ) showed an independent significant relation. Prevalence of diastolic dysfunction was highest in alcoholics followed by NAFLD, HBV, HCV, Autoimmune and vascular etiology at our center.

**Conclusion:** According to the relation between severity of cirrhosis and diastolic dysfunction, we recommend cardiac assessment in all child B and C cirrhotic patient, as cardiovascular complications are the main cause of death in cirrhosis.

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### I. Introduction

Cirrhosis is a hepatic disease that presents in individuals aged 50–60 years, typically. Patients with liver cirrhosis are reported to have a hyperdynamic circulation, which is manifested as high cardiac output, decreased systemic vascular resistance, and widespread arterial vasodilatation, primarily. Based on many previous studies traditionally, cirrhosis is associated with cardiovascular abnormalities. Cirrhotic cardiomyopathy is the term used to describe a collection of characters expressive of abnormal heart structure and function in patients with cirrhosis. The term “cirrhotic cardiomyopathy” is generally defined by the following clinical criteria: (1) baseline increased cardiac output but blunted ventricular response to stimuli, (2) systolic and/or diastolic dysfunction, (3) absence of overt left ventricular failure at rest, and (4) electrophysiological abnormalities including prolonged QT interval on electrocardiography and chronotropic incompetence. The prognosis of patients suffering from cirrhosis and portal hypertension is determined by the development of and severity of complications. The classic complications of decompensated cirrhosis and portal hypertension, include formation of esophageal varices and ascites, which may further precipitate hepatic nephropathy and encephalopathy, but complications may affect many other organ systems. Ventricular diastolic compliance and diastolic function can be assessed by measuring the velocity of blood flow from the left atrium to the left ventricle during early diastole (the E wave) and late diastole (the A wave) and calculating the E/A ratio by using the Doppler echocardiography. In other words, determinants of a diastolic dysfunction on a Doppler echocardiogram are decreased E/A ratio the ratio of early to late (atrial) phases of ventricular filling and delayed early diastolic transmitral filling with prolonged deceleration and isovolumetric relaxation times. In this

study, we evaluated the association of diastolic dysfunction severity and severity of cirrhosis patients who were admitted at our centre.

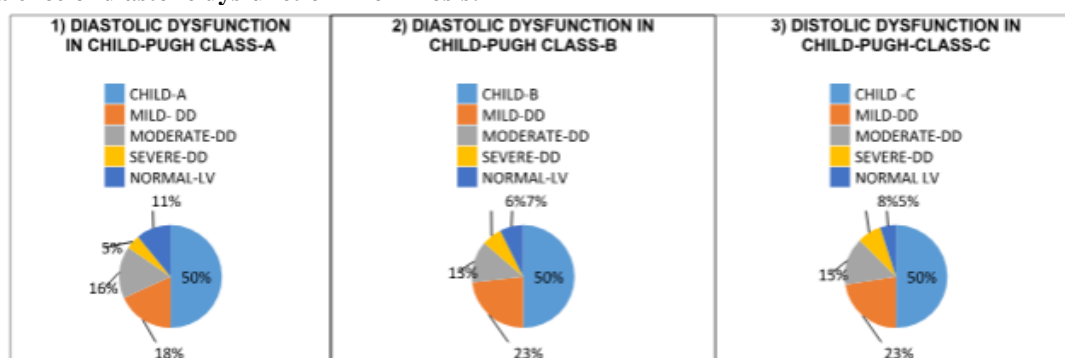
## II. Material and Methods

We enrolled 250 Cirrhotic patients, either admitted in our hospital or followed as out-patients, from January 2016 to March 2018 were considered for the study. Diagnosis of cirrhosis was established through combination of clinical, biochemical and imaging findings. Severity of the cirrhosis was evaluated by Child-Pugh criteria and divided in three groups: A (mild), B (moderate), and C (severe). Echocardiographic studies were performed by expert cardiologist. Exclusion criteria were: 1) Evidence of cardiovascular disease, respiratory disease, renal disease or any other major systemic disease 2) Cardiac arrhythmias (3) Recent bleeding(<3months) (3)Hemoglobin < 9 gm/dl(4) Serum creatinine > 1.5 mg/dl(5) Patients with systemic hypertension and diabetes mellitus(6)Age <25years and >65years.

## III. Results

210(84%)patients were male and 40(16%)were female.The mean age of patients was  $52.78 \pm 15.2$  years. 55(22%),95(38%)and 100(40%)of patients were considered as child class A, B, and C, respectively.Of 250 patients 109(43.6%),73(29.2%),32(12.8%)were having Mild, Moderate, severe diastolic dysfunction respectively with 36(14.4%)being normal LV function.There was a significant relation between diastolic dysfunction and disease duration ( $P<0.001$ )and severity of cirrhosis( $P<0.048$ ).On multivariate analysis,decreased E/A ratio ( $P = 0.03$ )and disease duration ( $P = 0.02$ )showed an independent significant relation. Results are shown in the following figure.

### Prevalence of diastolic dysfunction in cirrhosis:



### Various aetiology of cirrhosis with diastolic dysfunction:

ETIOLOGY	NORMAL	MILD LV DYSFUNCTION	MODERATE LV DYSFUNCTION	SEVERE LV DYSFUNCTION	TOTAL
HBV	4	6	4	5	19
HCV	3	2	3	5	13
AUTOIMMUNE	1	0	1	1	3
BCS/VASCULAR	0	1	2	1	4
ALCOHOLIC	24	52	36	64	176
NAFLD	17	5	3	10	35

## IV. Conclusion

According to the relation between severity of cirrhosis and diastolic dysfunction, we recommend cardiac assessment in all child B and C cirrhotic patients as cardiovascular complications are the main cause of death in cirrhosis.

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