ORIGINAL ARTICLE

Frequency of Cardiomyopathy in patients with Liver Cirrhosis and its Correlation with Severity of Cirrhosis

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ABSTRACT

Background: Cirrhotic cardiomyopathy is a complication of cirrhosis characterized by gradual deterioration in cardiac function and it has a positive correlation with severity of cirrhosis.
Aim: To determine the prevalence of cardiomyopathy in cirrhotic patients and its correlation with different grades of cirrhosis.
Methods: It was a cross sectional study conducted at the department of Medical Unit III. Sir Ganga Ram Hospital, Lahore. 170 patients with liver cirrhosis were enrolled in the study and their E/A ratio was calculated using echocardiography. The patients having E /A ratio > 1 were labeled as having cirrhotic cardiomyopathy. The data was stratified for grades of cirrhosis and Chi-square test was used with P-value ≤ 0.05 taken as significant.
Results: Out of the total 170 patients, 79(46.5%) were male and 91(53.5%) were female and cirrhotic cardiomyopathy was found in 7 (44.8%) patients.
Conclusion: Cirrhotic cardiomyopathy is a significant complication of cirrhosis and correlate well with degree of fibrosis.
Key words: Liver Cirrhosis, Cardiomyopathy, Child-Pugh score, Echocardiography.

INTRODUCTION

Liver cirrhosis is an advanced stage of progressive hepatic fibrosis, the hallmark of which is architectural distortion and formation of regenerative nodules. According to an estimate about 20 million people worldwide have liver cirrhosis or liver cancer and 2 million people die each year.[1] There are many complications associated with this disease which reduce the life expectancy and cirrhotic cardiomyopathy is one of these complications[2]. It is defined as gradual decline in contractile function of heart or altered diastolic relaxation in response to stress in cirrhotic patients without known cardiac disease. It is often associated with electrophysiological abnormalities such as QT interval prolongation.[3] Cirrhotic cardiomyopathy is the second common cause of post liver transplant mortality (7-21%), first being the transplant rejection[4]. Cirrhotic cardiomyopathy was first described as a hyperdynamic circulatory response in cirrhotic patients about a half century ago and abnormal thiamine metabolism and endogenous vasodilators were considered responsible for this.[5] The diastolic dysfunction (decreased E/A ratio & delayed relaxation time) can be assessed using doppler echocardiography and masked systolic dysfunction can be evaluated with dobutamine stress echocardiography.[6-8] Electrocardiography (ECG), and serum markers like troponin T, troponin I, BNP (brain natriuretic peptide) also help in diagnosing this condition.[9,10] The prevalence of cardiomyopathy among the cirrhotic patients is unknown in Pakistan despite having a high burden of liver cirrhosis due chronic hepatitis C. A study conducted by Naqvi et al at Dow University of Heath Sciences, Karachi showed that cirrhotic cardiomyopathy was present in 39.32% and grade of fibrosis had a statistically significant correlation[11].

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MATERIALS AND METHODS

The study was carried out at Medical Unit III, Sir Ganga Ram Hospital, Lahore after taking approval from institutional review board. Sample size of 170 cases was calculated with 5% margin of error, 95% confidence interval and taking 12% as expected percentage of cirrhotic cardiomyopathy. The study was carried out from January 2018 to December 2018 after the approval from IRB. Patients of both gender with age 20 to 40 years having confirmed liver cirrhosis (clinical, radiological and laboratory parameters) were enrolled. Patients having history of previous cardiac disease and those with multiple co-morbidities like DM, HTN, CRF or taking drugs causing cardiomyopathy like dacarbazine were excluded from the study. After taking informed written consent demographic data was recorded. Liver cirrhosis was further categorized into three grades (A, B, C) according to Child-Pugh classification. Echocardiography was performed by consultant cardiologist to calculate E /A ratios (velocity of diastolic early filling wave(E) / velocity of late filling wave(A). The patients were labeled as cirrhotic cardiomyopathy if E/A ratio was more than one. All the information was obtained on a specially designed proforma. Statistical analysis was performed using SPSS version 22. Data was stratified for the grades of liver cirrhosis (A, B, C) for cardiomyopathy. Age (quantitative variable) was presented as means and standard deviations Gender, grades of liver cirrhosis and presence of cardiomyopathy (qualitative variables) were presented as frequency. Chi-

square test was used as test of significance with P-value < 0.05 taken as significant.

RESULTS

A total of 170 patients were enrolled in our study, out of which 79 (46.5%) patients were male and 91 (53.5%) were females. The mean age was 37 years (±11.6SD) with maximum 57 (53.5%) patients were present in the age group of 40 to 45 years. Out of 170 patients, 31 (18.2%) patients were in Child Pugh A, 73 (42.9%) patients were in Child Pugh B and 66 (38.9%) patients were in Child Pugh C. Out of total 170 patients, 76 patients (44.7%) were having cardiomyopathy while 94 patients (55.3%) were not having cirrhotic cardiomyopathy. Among those having cirrhotic cardiomyopathy, 9 patients were in Child A, 26 patients were in Child B and 41 patients were in Child C group. A strong relationship was found between cardiomyopathy and severity of cirrhosis (P=0.001).

Table 1: Baseline Characteristics of Study Participants

Parameters	**Value**
Age	
Mean (±SD)	51.44 (±7.32)
Gender	
Male	79 (46.5)
Female	91 (53.5)
Child-Pugh Class (%)	
A	31 (18.2)
B	73 (42.9)
C	66 (38.9)
Cirrhotic Cardiomyopathy (%)	
Positive	76 (44.7)
Negative	94 (55.3)

Table 2: Cross tabulation of grades of cirrhosis against age of the patients

	Child Pugh Classification			**N=170**
	Grade A	**Grade B**	**Grade C**	
Age in yrs				
20-25	3	13	3	
25-30	5	17	12	427
30-35	8	18	09	42
35-40	8	13	12	40
40-45	7	12	30	57
	31	73	66	170

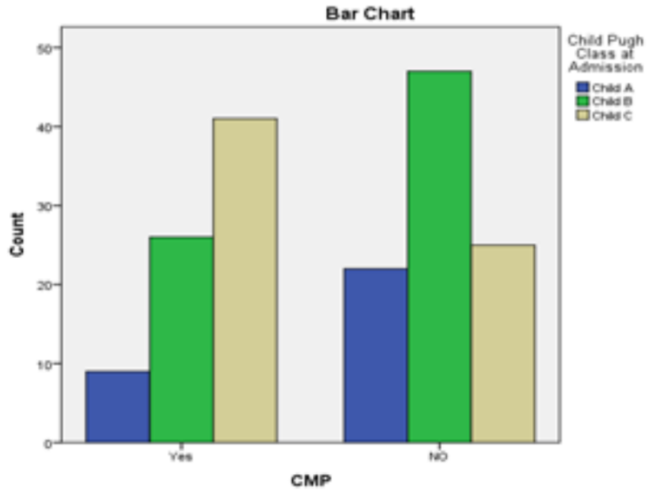

Table 3: Cross tabulation of grades of cirrhosis against cardiomyopathy.

Cirrhotic Cardiomyopathy	**Child Pugh Classification**			**N=170**
	Grade A	**Grade B**	**Grade C**	
Positive	9	26	41	76
Negative	22	47	25	94

P value 0.001

DISCUSSION

Patients with liver cirrhosis have compromised cardiac contractility that manifests clinically under stressful situations.[12] In our study cirrhotic cardiomyopathy has been found in 44.8% patients (76/170). Female gender was dominant in the study population which was 91(53.5%). Most of patients were present in age group of 40 to 45 years. A positive and statistically significant correlation was found between cardiomyopathy and severity of liver cirrhosis. Our results are similar to a study conducted by Naqvi et al at Dow University of Heath Sciences, Karachi. They enrolled 89 patients with cirrhosis, out of which 35 patients (39.32%) were found to have cirrhotic cardiomyopathy. They also found that systolic & diastolic dysfunction, cardiac biomarkers and prolonged QT interval were significant parameters in patients with cirrhotic cardiomyopathy (P<0.001). They also found that parameters of cirrhotic cardiomyopathy have a positive correlation with stage of hepatic fibrosis.[11] Another similar study was conducted by Sheikh et al on 74 patients with liver cirrhosis; 12.2% belonged to Child-Pugh A, 39.2% to Child-Pugh B and 48.6% in Child-Pugh C group. Cirrhotic cardiomyopathy was present in 33 patients (44.6%) [13] A Korean study conducted in 2010 at Yonsei University Wonju College of Medicine, showed blunted ventricular systolic response to pharmacological stress (dobutamine) in 25.4% patients (18/71) These 18 patients who had blunted dobutamine stress echocardiography response were having significantly higher baseline ejection fraction compared with those with having normal dobutamine stress echocardiography response (P<0.05). The diastolic dysfunction markers like baseline and peak E/A ratios, were also higher in cirrhotic patients compared to non-cirrhotic patients (P<0.001).[14]

CONCLUSION

Cirrhotic cardiomyopathy is a grave complication of cirrhosis, the severity of which correlate well with stage of liver fibrosis.

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