

# To Find the Frequency of Cirrhotic Cardiomyopathy in 100 patients of Chronic Liver Disease

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## ABSTRACT

**Aim:** To find the frequency of cirrhotic cardiomyopathy in patients of chronic liver disease.

**Study design:** It was a pure cross sectional type of study.

**Duration:** After approval of synopsis, it consisted of six months i.e., from 12/04/2018 to 11/10/2018.

**Methods:** This study was consisted of 100 patients of both sex, having age range of 16-70 years & have cirrhosis of liver assessed at least half year previously. All of them underwent transthoracic echocardiography to look for cardiomyopathy to be assessed by looking at diastolic dysfunction (i.e. increase in ratio of E/A more than 1). Each individual enrolled in current study is asked for written consent.

**Results:** Mean age of patients was found to be  $51.9 \pm 9.8$  years. There were 61 males (61%) & 39 females (39%) have man to woman ratio of 1.6:1. Mean BMI was  $26.5 \pm 3.7$  Kg/m<sup>2</sup> and mean duration of cirrhosis of liver was  $22.0 \pm 10.9$  months. Majority (n=49) of them (49%) were of Child Pugh Class C followed by 39% of Class B & then 12% of Class A. Cardiomyopathy with cirrhosis of liver was seen in 41%. No significant difference was seen statistically in frequency of cardiomyopathy with cirrhosis of liver across all groups based on age (p value less than 0.928), sex (p value less than 0.997), BMI (p value less than 0.983)

**Practical implication:** If all chronic liver disease patients are screened for cardiomyopathy by echocardiography early, then we can improve quality of life for these patients & hence can survive longer.

**Conclusion:** Cardiomyopathy associated with cirrhosis of liver was seen in a large percentage of cirrhosis liver cases and was found to be more frequent in those with more severe illness which guide us for doing transthoracic echocardiography to screen all these to timely identify and manage this complication to improve case outcome.

**Keywords:** Cirrhosis Liver, Cardiomyopathy, Child-Pugh Class

## INTRODUCTION

Chronic liver disease is most prevalent liver disease all over the world, ending up in liver cirrhosis<sup>1</sup>. Cirrhosis of liver is more common in men than women. The cost of cirrhosis in terms of human suffering, hospital costs, and lost productivity is high. Cirrhosis liver and chronic liver diseases were 10<sup>th</sup> major cause of death for men and 12<sup>th</sup> for women in United States in 2001, killing about 27,000 people each year<sup>2,3</sup>. Patients with cirrhosis usually have abnormalities in systemic and pulmonary circulation characterized by increased cardiac output, decreased systemic vascular resistance and low blood pressure<sup>4</sup>. Cirrhosis may be complicated by cardiac dysfunction especially diastolic. The patients having cirrhotic cardiomyopathy have a higher level of lipopolysaccharide binding proteins. From a functional point of view, the heart in cirrhosis is both hyperdynamic and dysfunctional<sup>5</sup>. The incidence of cirrhotic cardiomyopathy varies in a different studies from 49% to 63.7%<sup>6,7</sup>. It is necessary to identify cirrhotics who are suffering from cardiomyopathy when assessing them for liver transplant. Cardiomyopathy can worsen an already compensated disease or new cardiac failure can develop post-transplant<sup>8,10</sup>. Therefore it may be advisable to start pre-transplant cardiac treatment. This will reduce the risk of cardiac related complications in the post and peri-transplant period.

Purpose of study is to determine frequency of cardiomyopathy with liver cirrhosis. In local population frequency of cirrhotic cardiomyopathy is quite high<sup>8</sup>. In routine clinical practice cirrhotic cardiomyopathy is ignored as a complication in spite of relatively high prevalence. This will help us to manage patients of cirrhotic cardiomyopathy in a better way and to improve morbidity and mortality related to it.

**Cirrhosis of Liver:** Presence of AST >2 times upper normal value, platelet count of <160,000/mm, PT activity <100%, and ultrasound appearance of liver showing fibrosis.

**Cardiomyopathy:** It was labelled if there was diastolic dysfunction present (i.e. increase in E/A ratio >1) assessed on transthoracic echocardiography.

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## MATERIALS AND METHODS

It was a cross-sectional type of study and was conducted in Department of Medicine, Ghurki Trust Teaching Hospital in Lahore. It was conducted for 6 months after approval of synopsis by Ethical Committee from 12/04/2018 to 11/10/2018. Sample of 100 patients was calculated using 95% confidence level, 10% margin of error and taking expected percentage of cirrhotic cardiomyopathy i.e. 49% in all cases with liver cirrhosis<sup>(6)</sup>. Patients were entered by non-probability, consecutive sampling technique. Those of age 16-70 years, of either sex presenting with cirrhosis of liver (as per operational definition) for at least 6 months were **included** while patients having hypertension (BP  $\geq 160/90$  mmHg) and diabetes mellitus (BSR  $\geq 200$  mg/dl) pregnancy, already on treatment for cardiomyopathy and with previous myocardial infarction, CABG, PCI or heart failure were **excluded**. One hundred patients fulfilled inclusion criteria were enrolled in department of medicine, Ghurki Trust Hospital Lahore. Informed consent was taken. Demographic variables (name, age, sex, BMI, duration of cirrhosis, Child-Pugh score) were obtained. Each one had ECG and echocardiography done and those who met the criteria as in operational definition (QT/EA) were labeled as having cirrhotic cardiomyopathy. Patients diagnosed as having cardiomyopathy were treated by standard procedure. All information was documented in a proforma especially designed for this purpose & data was analyzed by SPSS version 20 Numerical variables i.e. age, BMI and duration of cirrhosis have been looked by mean  $\pm$ SD. Categorical variables i.e. sex, Child Pugh class and cardiomyopathy have been examined as frequency and percentage. Data has been stratified for age, sex, BMI, Child-Pugh class and duration of illness to address effect modifiers. Risk stratification chi-square test has been applied taking p value  $\leq 0.05$  as significant.

## RESULTS

Range of age was seen from 35 to 65 years with a mean of  $51.9 \pm 9.8$ . There were 61 (61%) males and 39 (39%) females having ratio of males to females as 1.6:1. BMI of these was 21.1 to 33.9 Kg/m<sup>2</sup> with a mean of  $26.5 \pm 3.7$ . Duration of illness was from 8 to

48 months with a mean of 22.0±10.9. Majority (n=49) were of Child Pugh Class C (49%) followed by 39% Class B & 12% Class A. Cirrhotic cardiomyopathy was seen in 41 cases (41%) of cirrhosis of liver. No significant difference was seen statistically in frequency of cirrhotic cardiomyopathy across all groups based on age (p-value less than 0.928), sex (p value less than 0.997), BMI (p value less than 0.983) and time of illness (p value less than 0.782). However, it got significantly higher with higher Child Pugh Class; i.e., Class A vs Class B vs Class C (8.3% vs 35.9% vs 53.1%; p value<0.013) Chi-square test was applied and noted difference was statistically significant.

## DISCUSSION

For more than half a century, cirrhosis of liver has been known to cause alterations in systemic haemodynamic status;<sup>(1)</sup> It has now become clear that these changes occur with change in splanchnic circulation<sup>(4)</sup>. Moreover, alterations of autonomic nerve system, baroreceptors and increase in arterial compliance with cirrhosis liver aggravate the illness<sup>(1)</sup>. In 1953, cardiovascular illnesses linked with cirrhosis of liver were initially defined in alcoholics by Kowalski & Abelmann, but for many years, it was seen that these were linked with alcohol use for a long time<sup>(1)</sup>. Similar issues were seen in those with cirrhosis of liver due to hemochromatosis, but in this case changes were supposed to be due to hemochromatosis<sup>6</sup>. Caremelo et al. initially observed cirrhotic cardiomyopathy in 1986. A number of researches have already reported that a large percentage of cirrhosis liver cases have found to have cirrhotic cardiomyopathy<sup>6,7</sup>. However, frequency got varied among existed studies. In this study, average age was 51.9±9.8 years. A similar average age was found to be 52±9 years by Ali et al<sup>11</sup> in Mirpurkhas. On other hand Hussain et al<sup>12</sup> found it to be 51.13±6.04 years in Services Hospital in city of Lahore District. Achakzai<sup>13</sup> & Almani et al<sup>14</sup> also found similar mean of 54±11 years & 53.09±8.86 years respectively in local setup. A same mean of 55.04±12.06 years was found by Mansour Ghanaei et al<sup>15</sup> in Iranians. On the other side Penteado et al<sup>16</sup> found it to be 51.5±7.7 years in Brazil. Bhattacharyya<sup>17</sup> & Deepika et al<sup>18</sup> reported much less mean of 45.8±10.45 & 44±13.7 years respectively in Indians.

We saw that there were 61 males (61%) and 39 females (39%) having male versus female ratio of 1.6:1. Our analysis is parallel to that of Ali et al<sup>11</sup> who reported similar preponderance of males (m:f, 1.5:1). Moreover, a female preponderance was seen by Achakzai et al<sup>13</sup> who found man versus woman ratio of 1:1.5 at Dow University Hospital, Karachi. El-Feki<sup>19</sup> & Mansour Ghanaei et al<sup>15</sup> also found same male preponderance with male versus female ratio of 1.5:1 & 1.9:1 in Egyptians & Iranians respectively. In this study, most (49%) were found to have Child Pugh Class C followed by 39% Class B & then 12% Class A. Our results are in line with Shaikh et al<sup>20</sup> who found same frequency of Child Pugh Class A (12.2%), Class B (39.2%) and Class C (48.6%) in cirrhosis liver at Liaquat University Hospital, in Jamshoro while Naqvi et al<sup>21</sup> saw frequency of Class A, Class B & Class C to be 11.4%, 31.4% & 57.2% respectively in those at Dow University of Health Sciences, Karachi. Kumar et al<sup>22</sup> also found same percentage of Child Pugh Class A of 12.2%, Class B of 38.9% and Class C of 48.9% in Indians.

We saw that Shaikh et al<sup>20</sup> in a likewise research found the frequency of cirrhotic cardiomyopathy to be 44.61% in those presented at Liaquat University Hospital, in Jamshoro Hyderabad. A similar frequency of 39.31% was reported by Naqvi et al<sup>21</sup> at Dow University of Health Sciences, in Karachi. A similar frequency of 44.6% was reported by Kumar et al<sup>22</sup> in Indian cirrhotics. Nisar et al<sup>6</sup> found much more high frequency of 49% at Services Hospital, in Lahore. While Bhatti et al<sup>24</sup> found much more less frequency of 24.71% in such cases in the city of Islamabad. Thus cirrhotic cardiomyopathy was seen in a large percentage of cases

and was more frequent in those with more severe illness. A very strong drawback to this research was that we could not take into consideration the improvement of cardiac status with respect to function of liver as evidence by our own results which showed increase in frequency of cirrhotic cardiomyopathy with higher Child-Pugh class (8.31% vs 35.91% vs 53.11%) have p value<0.013). It will help in risk stratification and optimal management of such patients.

## CONCLUSION

Cirrhotic cardiomyopathy was seen in a large percentage of cirrhosis liver cases and was more in those with more severe illness which guide us for routine transthoracic echocardiography to screen for cirrhosis liver patients to timely identify & manage this complication to improve the outcome.

**Conflict of interest:** Nil

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