ORIGINAL RESEARCH

To evaluate cardiac dysfunctions in patients with chronic liver disease

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ABSTRACT

Aim: To evaluate cardiac dysfunctions in patients with chronic liver disease.

Material and Methods: The research comprised 100 hospitalised individuals with chronic liver disease. All CLD patients were interviewed and their demographic data, symptoms, and presentation were obtained using a pre-designed structured proforma. Patients who declined to participate in the experiment, on the other hand, were not included. The height, weight, BMI, and belly circumference of each patient were all measured. At the start, vital indicators such as pulse, blood pressure, breathing rate, and SPO2 were collected and recorded. The patients were then subjected to a battery of tests, including a CBC, LFT, RFT, lipid profile, RBS, ascitic fluid analysis, ECG, and 2D ECHO.

Results: Patients without cardiac dysfunction had an average age of 41.69 years, while patients with cardiac dysfunction have an average age of 47.96 years. Cardiac dysfunctions were most common in CLD patients between the ages of 45 -55, with 90% of cases involving males and 10% involving women. When diastolic function was assessed, 75% of patients satisfied two of the three problematic criteria given above, 45% had an enlarged LVMI, and 52% had a larger LA size. All of the measures had a statistically significant link with the severity of CLD (P=0.021). Alcohol was the most common cause of chronic liver disease in both groups of study participants with and without cardiac dysfunction (70%), followed by hepatitis B (10%).

Conclusion: Diastolic dysfunction is the most prevalent aberrant cardiac presentation in chronic liver disease patients. There is no link between the onset of cardiac failure and the cause of chronic liver disease. There is a link between the severity of chronic liver disease and the development of heart dysfunction.

Keywords: Cardiac dysfunctions, Chronic liver disease, Diastolic dysfunction

INTRODUCTION

Chronic liver disease is a liver disease process that includes the gradual destruction and regeneration of the liver parenchyma, eventually leading to fibrosis and cirrhosis. Cirrhosis is caused by a variety of factors, including congenital, metabolic, inflammatory, and toxic liver illnesses. Cirrhosis is most often caused by persistent drinking, chronic hepatitis B and C, biliary disorders, and hemochromatosis.[1-3] Regardless of the origin of cirrhosis, the pathologic hallmarks include fibrosis to the point of architectural distortion and the production of regenerative nodules.[4] Cirrhotic patients are at a greater risk of several

problems and have a lower life expectancy owing to pathological effects on different systems in the body, including the cardiovascular system, which often go unrecognised. [5] Independent of the cause of the liver illness, the frequency is found to be between 40 and 50% in cirrhotic individuals. [6]

Cirrhosis causes a steady worsening of cardiac function, characterised by the absence of the hyperdynamic circulation leading to heart failure and decreasing cardiac output.[7] Cirrhotic cardiomyopathy is a cardiac condition seen in patients with cirrhosis that is characterised by impaired contractile responsiveness to stress stimuli and/or impaired diastolic relaxation, as well as electrophysiological abnormalities with a prolonged QT interval, in the absence of other known cardiac disease.[8-12] This is related to a decline in inotropic and chronotropic function, which occurs together with diastolic dysfunction and heart hypertrophy. Cardiovascular problems occur as a subclinical state in the majority of patients of chronic liver disease, manifesting primarily under stressful events such as TIPS and liver transplants, which have a dismal prognosis.[13] As many as 50% of cirrhotic patients having liver transplantation exhibit indications of cardiac dysfunction, and overt heart failure accounts for 7% to 21% of mortality after orthotopic liver transplantation.[13]

MATERIAL AND METHODS

After receiving approval from the institution, this research was carried out. The research comprised 100 hospitalised individuals with chronic liver disease. All CLD patients were interviewed and their demographic data, symptoms, and presentation were obtained using a pre-designed structured proforma. Patients who declined to participate in the experiment, on the other hand, were not included. Patients with ischemic heart disease, valvular heart disease, conduction abnormalities, cardiac arrhythmias, congenital heart defects, type 2 diabetes, hypertension, hypothyroidism, or hyperthyroidism, on the other hand, were excluded from the research. Each patient was subjected to a comprehensive general and physical examination. The height, weight, BMI, and belly circumference of each patient were all measured. At the start, vital indicators such as pulse, blood pressure, breathing rate, and SPO2 were collected and recorded. The patients were then subjected to a battery of tests, including a CBC, LFT, RFT, lipid profile, RBS, ascitic fluid analysis, ECG, and 2D ECHO. Every discovery was documented in the questionnaire.

STATISTICAL ANALYSIS

The data was compiled using MS Excel, and it was analysed using IBM SPSS software, version 25.0. Patients were separated into two groups depending on whether they had cardiac dysfunction or not (QTc prolongation, systolic dysfunction, diastolic dysfunction). To assess the connection between proportions, the chi square test was employed, and the unpaired t test was utilised to compare mean values. Statistical significance was defined as a P value of 0.05 or less.

RESULTS

Patients without cardiac dysfunction had an average age of 41.69 years, while patients with cardiac dysfunction have an average age of 47.96 years. Cardiac dysfunctions were most common in CLD patients between the ages of 45 and 55, with 90% of cases involving males and 10% involving women. QTc prolongation was seen in 28% of the people. When diastolic function was assessed, 75% of patients satisfied two of the three problematic criteria given above, 45% had an enlarged LVMI, and 52% had a larger LA size. All of the measures had a statistically significant link with the severity of CLD (P=0.021). Alcohol was the most common cause of chronic liver disease in both groups of study participants with and without cardiac dysfunction (70%), followed by hepatitis B (10%). There were a total of 100

participants. Of individuals, 70 had liver disease caused by alcohol consumption, whereas 10 had liver disease caused by hepatitis B. Wilson's illness (5%) and Hepatitis C (13% of patients) are in the other group.

Table 1: Age and gender distribution of the patients

	Without cardiac dysfunction=60	With Cardiac Dysfunction=40	Total	%
Age in years				
Below 25	0	0	0	0
25-35	20	11	31	31
35-45	12	15	27	27
45-55	20	11	31	31
Above 55	8	3	11	11
Gender				
Male	54	36	90	90
Female	6	4	10	10

Table 2: Etiology of CLD

Etiology	With Cardiac Dysfunction (%)	Without Cardiac Dysfunctions (%)	Total(%)	$\chi 2$	P Value
Alcohol	27	43	70	0.054	**0.74**
HepatitisB	3	7	10	0.55	**0.59**
HepatitisC	2	0	2		
Wilson's	2	3	5	0.39	**0.52**
Others	6	7	13		
Total	**40**	**60**	**100**		

Table 3: Diastolic Dysfunction in CLD patients

Diastolic Dysfunction	Number	%
Present	25	25
Absent	75	75

Table 4: Systolic Dysfunction in CLD patients

Systolic Dysfunction	Number	%
Present	22	22
Absent	78	78

DISCUSSION

Cirrhotic patients are at a greater risk of several problems and have a lower life expectancy owing to pathological effects on different systems in the body, including the cardiovascular system, which often go unrecognised. [5] Independent of the cause of the liver illness, the frequency is found to be between 40 and 50% in cirrhotic individuals.[6] Cirrhotic cardiomyopathy is a cardiac condition seen in patients with cirrhosis that is characterised by impaired contractile responsiveness to stress stimuli and/or impaired diastolic relaxation, as well as electrophysiological abnormalities with a prolonged QT interval, in the absence of other known cardiac disease.[8-12] Asymptomatic occurrences of heart failure are a key contributor in morbidity and death when patients with chronic liver disease undergo surgical procedures such as TIPS and liver transplants. This study was carried out to investigate the prevalence of heart dysfunctions in CLD patients. In this study, cardiac dysfunctions were investigated in 100 verified cases of CLD without any known cardiac diseases. The majority

(90%) of the patients were males, which was consistent with previous study results such as those by Abraham Sonny et al. [13] percent of patients were aged 35-45, while 31 percent were aged 25-35 and 45-55, respectively (Table 1). Patients without cardiac dysfunction had an average age of 41.69 years, while patients with cardiac dysfunction have an average age of 47.96 years. Patients with CLD who had cardiac dysfunction tended to be above the age of 55. Increased SVI and CI, which indicate the presence of vasodilation, were found to be markers of hyperdynamic circulation in 46% and 43% of patients, respectively (P=0.041). Cirrhotic patients had higher CI, SVI, and Cardiac Cycle Efficiency values while standing. Tarquini et al. conducted this research. [14] The LVEF was larger than 63 percent in 40% of the patients and decreased in 25% of cases, perhaps indicating cirrhotic cardiomyopathy. Ascites may also produce low EF, and the risk increases after peritoneal fluid drainage. The changes in LVEF in a series increased with increasing severity of liver disease and were statistically significant (P=0.051). According to Kwon et al.[15,] LVEF less than 62% is associated with increased post-live transplantation mortality in advanced liver disease, emphasising the need of assessing both LVEF and liver disease severity simultaneously. When diastolic function was assessed, 75% of patients satisfied two of the three problematic criteria given above, 45% had an enlarged LVMI, and 52% had a larger LA size.[16]. All of the measures had a statistically significant link with the severity of CLD (P=0.021). As a consequence, our research found DD to be a marker of cardiac dysfunction, which is similar with previous investigations, such as one conducted at IPGMER Kolkata in 2003 by De et al.[17]. The relevance stems from the fact that it is simpler to assess, despite the fact that it is not always clinically obvious. The IPGMER analysis also confirmed the presence of abnormalities in the NCPF, pre-ascitic, and ascitic cirrhotic groups. In a separate study,[18] DD was found in 61.9 percent of patients, with cirrhotic cardiomyopathy seen among 70% of patients and being more frequent in drinkers. [19] Alcohol was the most common cause of chronic liver disease in both groups of study participants with and without cardiac dysfunction (70%), followed by hepatitis B (10%). There were a total of 100 participants. Of individuals, 70 had liver disease caused by alcohol consumption, whereas 10 had liver disease caused by hepatitis B. Wilson's illness (5%) and Hepatitis C (13% of patients) are in the other group. The current study's findings are consistent with those of Weigand et al, Shivram Prasad et al, and Kirnake et al. In all of these studies, alcohol is the most common aetiology for cirrhosis. [20,21]

CONCLUSION

Diastolic dysfunction is the most prevalent aberrant cardiac presentation in chronic liver disease patients. There is no link between the onset of cardiac failure and the cause of chronic liver disease. There is a link between the severity of chronic liver disease and the development of heart dysfunction.

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