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An observational study on cardiac profile in patients of chronic liver disease in a tertiary care hospital in Kolkata

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Abstract: *In chronic liver disease , heart is one of the functionally compromised organs . Purpose of this study was to evaluate the incidence of cardiac dysfunction in patients of liver cirrhosis irrespective of etiology and also to establish correlation between severity of chronic liver disease (MELD) with incidence of cardiac dysfunction . This was an institution based cross sectional study among total 280 patients .Most of the patients had cardiac dysfunction in the form of diastolic dysfunction . QTc prolongation was also found in moderate no of patients and it was more in alcoholic patients as compared to non alcoholic group . Further studies are needed regarding cardiac profile in such patients .*

Key points: *Chronic liver disease , MELD , Diastolic dysfunction , QTc prolongation*

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I. Introduction

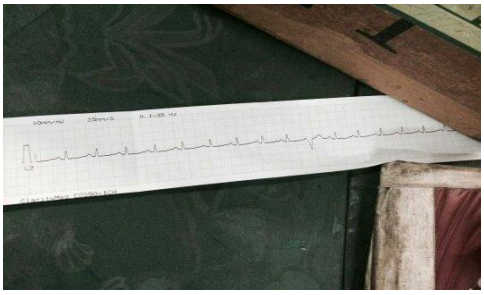
Chronic liver disease is progressive destruction of liver parenchyma over a period of 6 months leading to fibrosis and cirrhosis .Clinical course of patients with chronic liver disease is complicated by progressive impairment of circulatory function and [(1)] Three major pathophysiologic features of cardiac dysfunction of these patients are – structural and functional ventricular abnormality (in form of left ventricular hypertrophy and diastolic dysfunction , electrophysiological abnormality (prolonged corrected QT interval) , ventricular dysfunction in response to stress or exercise . In a study by Patil & Lal et al [(2)] , diastolic dysfunction was found to be proportional with severity of chronic liver disease. Prolongation of corrected QT (QTc) was more with higher grade of MELD Stage 3 (458.53 ± 22.83 ms) than MELD 2 or 1 (439.03 ±11.80 ms , 407.38 ± 21.65 ms respectively). In the same study mean LAD was higher for higher MELD stage (stage 3) . In another study by Achecar & A. Gonzalec-Tallon[(3)] in 2011 showed that 50% of cirrhotic patients had left ventricular diastolic dysfunction where its prevalence was 51 % in a study by Salari et al .[(4)] In a study done in 2013 , among the 231 patients with cirrhosis ,118 (51.1%) met criteria for cirrhotic cardiomyopathy . In another study by Dadhich & Goswami et al [(5)] , overall LVDD was diagnosed in 28/40 (70%) of cirrhotic patients. LVDD was seen as follows healthy controls (0%), pre-ascitic cirrhosis (60%) and ascitic cirrhosis (80%). Eleven patients had Stage I (impaired relaxation) LVDD, while 17 had Stage II (pseudo normal) LVDD in that study .The aim of this study was to evaluate the incidence of cardiac dysfunction (in form of surface ECG and 2D echocardiography) in patients of liver cirrhosis irrespective of etiology and also to establish correlation between severity of chronic liver disease (in form of MELD) with incidence of cardiac dysfunction .

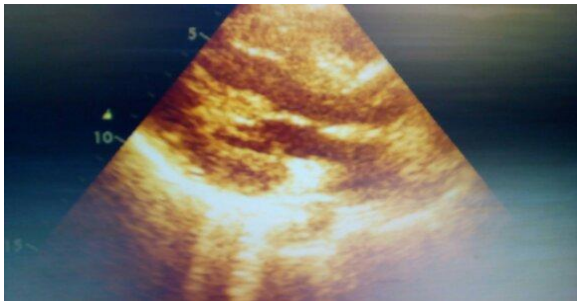
II. Material and method

This was an institution based cross sectional study conducted in Medical College Kolkata ,General Medicine inward patients from january to june of 2016 , over a period of 6 months among total no 280 patients of chronic liver disease under selection criteria . Patients of 18 – 65 years of age were considered for the study . Case was defined as those patients with clinical features and investigations suggestive of chronic liver disease . Among clinical features , history of ascites , encephalopathy ,hematemesis ,melena , splenomegaly (mild to severe) , stigmata of chronic liver disease (gynecomastia , spider navi ,and others) were included and among investigations we considered serum albumin (<3 mg /dl) and USG abdomen and fibroscan suggestive of cirrhosis . chronic liver disease from right heart failure , evidence of congestive heart failure , known coronary artery disesae , valvular abnormalities , and other causes of cardiomyopathy and drugs causing prolonged QT were excluded from the study . Patient particulars including treatment history , history of decompensation , etiology (alcoholic or nonalcoholic) , investigations including serum albumin , INR, total bilirubin, urea , creatinine , surface ECG (QT interval corrected by Bazett formula) , 2D echocardiography with color doppler study and MELD score were taken as study parameters . All data were compiled in MS excel 2007 form and statistical analysis done by SPSS software .

III. Results

In this study , 204 (73%) were male and rest (76- 27%) were female.112 of the study subjects were of age group between 18 to 30 yrs and rest (168 – 60%) were between 30 -65 yrs. 173(61.8%) of the patients were alcoholic and rest (107- 38.2%) were due to causes other than alcoholism . 36 (13 %) study subjects were treatment naïve , 148(53%) had history of treatment for at least 3 month and 96(34%) were noncompliant .





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Diastolic dysfunction among alcoholic group were in 123/173 and and non-alcoholic group were in 72/107 (odd ratio were 1.19 and 1 respectively). Diastolic dysfunction in treatment naïve group were 24 out of 36 , treated at least for 3 months group were 85/148 and in noncompliant group were 86/96 (Odd ratio – 1, 0.67 , 4.3 respectively)

Regarding QT interval , 91/ 173 alcoholic had QT prolongation while 42/107 had no QT prolongation (odd ratio 1.72 and 1 respectively) .QT prologation in in treatment naïve group were 9 out of 36 , treated at least for 3 months group were 45 /148 and in noncompliant group were 79 /96 (Odd ratio – 1, 1.31 , 13.94 respectively) ……. (Table 1)

Diastolic dysfunction was present in 69.6 % of patients with mean MELD score of 19.59 ± 3.62 ,left atrial diameter more than 40 mm was present in 12.5% patients with mean MELD score of 20.26 ± 3.94 , reduced ejection fraction (<45%) was found in 16.8 % patients with mean MELD was 20.16± 8.02 , regional wall motion abnormality was present in 4.6% study population with mean MELD was 23.68± 6.05 , prolonged QTc was present in 133 patients and mean MELD score for that group is 19.64 ± 7.63….. (table 2 and figure 3) In the distribution of regional wall motion abnormality , it was found that 13.11% had global hypokinesia , 9.84 % had lateral wall hypokinesia and 80.33 % had no RWMA …..(Figure 1) . Correlation between MELD score and LVEF shows significant correlation between them (rho value is significant) (figure 2)

Figure and table -

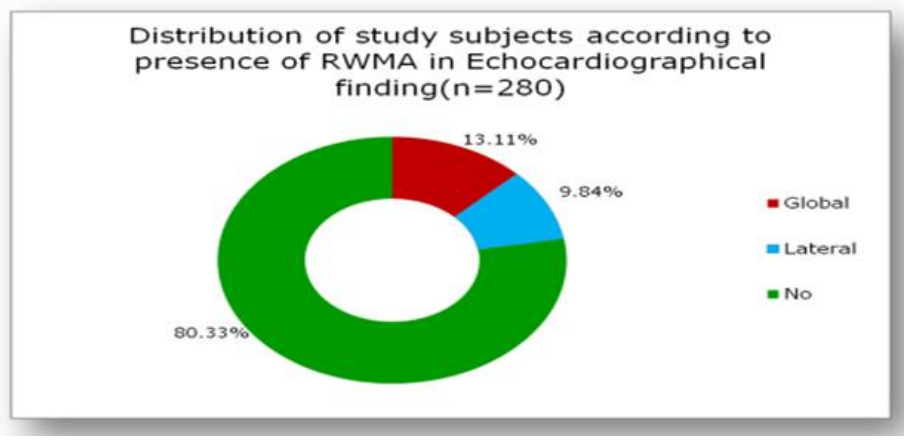
Table 1 shows frequency and odd ratio of Diastolic dysfunction and Qt prolongation regarding etiology and treatment history .

	frequency	Odds ratio(95% CI)
Diastolic dysfunction (195)		
• Etiology -		
alcoholic	123 (/173)	1.19(1.06-2.17)
nonalcoholic	72(/107)	1
• Treatment history -		
naive	24 (/36)	1
Atleast 3 month	85(/148)	0.67(0.31-1.45)
Noncompliant	86(/96)	4.3(1.6-11.16)
QT c Prolongation (133)		
• Etiology -		
alcoholic	91(/173)	1.72(1.05-2.80)
nonalcoholic	42(/107)	1
• Treatment history		
naive	9(/36)	1
Atleast 3 month	45(/148)	1.31(0.57-3.01)
Noncompliant	79(/96)	13.94(5.56-34.93)

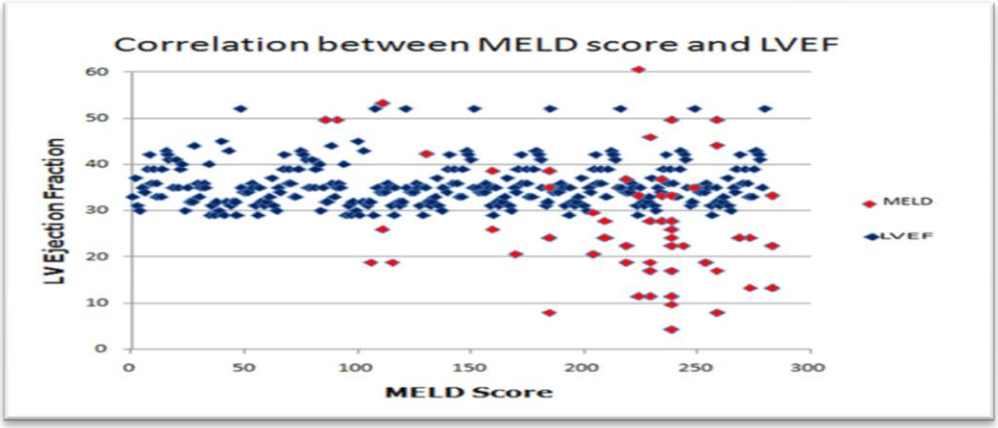
Table 2 shows different frequency , mean of cardiac parameters in CLD patients

Variables	Categories	Frequency(%)	Mean(SD) MELD score	P value
Diastolic dysfunction	Present	195 (69.6)	19.59(3.62)	<0.0001
	Absent	85 (30.4)	14.93(2.78)	
LAD >40 mm	Present	35(12.5)	20.26(3.94)	<0.0001
	Absent	245(87.5)	14.71(5.01)	
Reduced EF (<45%)	Present	47(16.8)	20.16(8.02)	<0.0001
	Absent	233(83.2)	13.42(5.68)	
RWMA	Present	13(4.6)	23.68(6.05)	0.0005
	Absent	267(95.4)	17.91(5.73)	
Prolonged QTc	Present	133 (47.5)	19.64(7.63)	<0.0001
	Absent	147 (52.5)	15.26(6.92)	

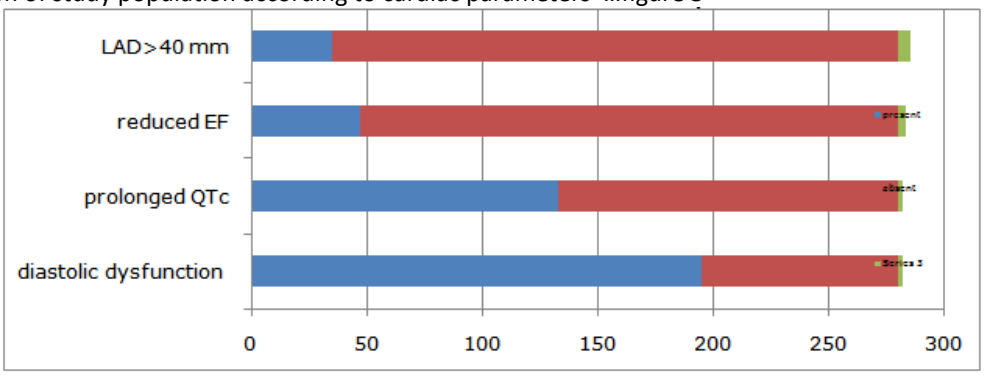
Distribution of regional wall motion abnormality in echocardiography – figure 1



Correlation between MELD and LVEF … figure 2



Distribution of study population according to cardiac parameters …figure 3



IV. Discussion

A detailed discussion of the present study and different studies in literature is represented in tabulated form for better comparison . Diastolic dysfunction was found to be predominant cardiac changes in this study similar to the studies by Patil et al [(2)] and Naik et al [(7)] . QT prologation in this study in 47.5% while in study by LI et al it is in 46.93%.Regarding etiologic analysis , QT prologation was more in alcoholic (53%) similar to study by Salari et al [(4)] (56 %)

Cardiac features in different study	study	Patil et al (2)	Bernardi et al(6)	Naik et al (7)	Kosar et al (8)	Li et al(9)	Salari et al(4)
Total	280	60	107	50	380	130	100
Diastolic dysfunction	195 (69.6%)	29 (48.33%)	-	33 (66%)	-	-	51%
Qt prolongation	133 (47.5%)	23 (38.3%)	46.2%	-	32%	46.93%	-
Mean Left atrial diameter	36.56±5.02 mm	37.09 ± 4.20 mm	-	35.8 ±4.55 mm	-	-	-

Cardiac features and relation to etiology	present study	Mohamed et al (10)	Somani et al (11)	Bernardi et al(6)	Salari et al (4)
Diastolic dysfunction	Alcoholic 44% , nonalcoholic 67%	-	Alcoholic 30%,nonalcoholic 30%	-	-
QTc prolongation	Alcoholic – 53% Nonalcoholic – 39.2%	Alcoholic 88% , nonalcoholic 82%	-	42.9%alcoholic , 47% nonalcoholic	Alcoholic-56% . nonalcoholic _- 42.1%

V. Conclusion

hronic liver disease patients may have different cardiac dysfunctions , predominantly diastolic dysfunction and abnormal QTc prolongation . This study corroborates with the similar studies , but in eastern India cardiac evaluation related study of CLD patient are less. Further studies are required in this field for more detailed evaluation ragrding this field . .

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Conflict of interest – none

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