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AN ANALYTICAL CROSS-SECTIONAL STUDY REGARDING CARDIOMYOPATHY AMONG CIRRHOTIC PATIENTS

General Medicine

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ABSTRACT

Patients with liver cirrhosis present an impaired ventricular ejection of fraction under physical stress compared with non-cirrhotic subjects. This is mainly related to inadequate heart rate response and decreased myocardial contractility under exercise. A prolonged QT interval represents a common electrocardiographic finding in patients with cirrhosis and served as predictor of the increased risk of ventricular arrhythmia and/or sudden death. Electrocardiographic assessments may be helpful to identify cirrhotic patients with prolongations of QT interval and arrhythmias.

KEYWORDS

INTRODUCTION

Patients with liver cirrhosis present an impaired ventricular ejection of fraction under physical stress compared with non-cirrhotic subjects. This is mainly related to inadequate heart rate response and decreased myocardial contractility under exercise [1,2].

Liver cirrhosis was associated with changes in expression of collagen isoforms in ventricular heart tissue has been shown to be involved to correlate with diastolic dysfunction in cirrhosis. [3].

A prolonged QT interval represents a common electrocardiographic finding in patients with cirrhosis and served as predictor of the increased risk of ventricular arrhythmia and/or sudden death [4]

In addition, elevated bile salts as well as uric acid plasma level have been shown to predispose to prolonged QT intervals in cirrhotic patients [5]. Electrocardiographic assessments may be helpful to identify cirrhotic patients withprolongations of QT interval and arrhythmias.

OBJECTIVES:

1. Estimate the prevalence of cardiomyopathy among cirrhosis patients.
2. To investigate whether CCM is related to severity of liver disease.

Methodology:

- The current study was undertaken for 6 months among cirrhosis patients in the Medicine Department of the Saraswathi Institute of Medical Sciences.
- Cirrhosis was diagnosed using clinical, biochemical, echocardiography, and histological criteria
- Age under 18, known or suspected risk factors for cardiovascular disease (diabetes, systemic hypertension, smoking, and obesity defined as a BMI of 30 kg/m2), pulmonary major illness, severe anaemia (Hg 7 g/dL), hyperthyroidism and hypothyroidism, pregnancy, and baseline electrocardiographic or echocardio graphic evidence of structural heart disease, such as bundle branch block, regional wall motion abnormalities, or valvular heart disease, were all excluded.
- To avoid affecting the outcomes of the electrocardiographic testing, any therapy interacting with the cardiovascular system was stopped 24 hours before the examinations.

Analysis:

Statistical analysis was performed using MS-Excel. Discrete Variables were expressed as mean ± SD and continuous variables with frequency and percentage. Student's t-test, Fisher's Exact Test and Pearson's correlation were used when appropriate. P values < 0.05 were considered as significant.

Electrocardiographic examination

A 12-lead ECG was performed on the patients, and the corrected QT interval (QTc interval), adjusted for heart rate, was computed using Bazett's method [QTc=QTmax/(RR)1/2 interval]. A QTc interval of more than 440 milliseconds was regarded abnormally long. The QT interval is calculated by dividing the square root of the R-R interval in seconds by the commencement of the QRS complex to the termination of the T- wave using Bazett's principle[6]. To account for gender differences, a QTc > 450 ms for males and > 470 ms for females was considered abnormal or protracted, as described by European regulatory guidelines[7]

A MELD (Model for End-Stage Liver Disease)score is a number that ranges from 6 to 40, based on lab tests. It ranks your degree of sickness, which shows how much you need a liver transplant. The higher the number, the more urgent your case is. Score were calculated as per below formula online from [https://www.ailbsindia.com/meld-score-calculator/].

MELD = 3.78 × ln [Bilirubin (mg/dL)] + 11.2 × ln [INR] + 9.57 × ln [Creatinine(mg/dL)] + 6.43 Cirrhotic cardiomyopathy was diagnosed as QTc interval prolongation.

RESULT:

- 112 cirrhotic patients were evaluated for study. Among them only 54 fulfilled the inclusion criteria.
- The remaining were excluded from the study as per exclusion criteria: Diabetes mellitus (49%), hypertension (21%), ischemic cardiac disease (8%) and arrhythmia (7%).
- Regarding included patients, 46 (85%) were men, with mean age 54.3 ± 11.2 years. The etiology of cirrhosis was predominantly alcoholic (79.6%) followed by viral hepatitis (11.1%).
- Out of 54 cirrhosis patients 28 were found with prolong QTc interval. Among 28 patients; 23 (50%) were males and 5 (62.5%) were females had prolong QTc interval suggesting cirrhotic cardiomyopathy in 52% of total cirrhotic patients.

Table 1: Baseline Characteristic Of Cirrhotic Patients

Age		54.3 ± 11.2
Male		46 (85.2%)
Female		8 (14.8%)
Cirrhosis etiology	Vira l	6 (11.1%)
	Alc oho lic	43 (79.6%)
	Mix ed	5 (9.3%)
MELD score		9.2 ± 4.2
Heart rate (bpm)		68.6 ± 12
Systolic pressure (mmHg)		118 ± 12
Diastolic pressure (mmHg)		78 ± 22
Total S.Billirubin(mg/dL)		2.9 ± 0.8
Creatinine (mg/dL)		0.9 ± 0.3
S.Albumin (g/dL)		3.6 ± 0.4
International Normalized Ratio		1.39 ± 0.38
Prolong Qtc interval		28(51.8)
QTc interval duration		460 ±23

Continuous data presented as Mean± SD and categorical data as frequency and percentage QTc interval duration was 460 ± 23 ms. Out of total 54 cirrhotic patients 28 were recorded with >440ms QTc interval. So, 52% of cirrhotic patients had cirrhotic cardiomyopathy in present study.

Mean MELD score was 9.2 ± 4.2 with median 10[IQR: 8,Range: 6-28]. Patients with QTc interval prolongation tended to have higher MELD score (11.1 ± 3.7 vs 8.0 ± 2.7, P = 0.001).

Table 2: Association Of MELD Score And QTc Interval (Male)

Male	CCM+nt	CCM-nt	Total
MELD >10	19 (82.6%)	2 (8.7%)	21
MELD <10	4 (17.4%)	21 (91.3%)	25
Total	23	23	46

Hazard ratio of cardiomyopathy among cirrhotic male patients with MELD score is HR: 5.65 OR= 49.88 with 95% CI :(8.18 , 303.93),p<0.05 (Significant difference present)

Table 3: Association Of MELD Score And QTc Interval (Female)

Female	CCM+nt	CCM-nt	Total
MELD >10	4 (80%)	2 (66.7%)	6
MELD <10	1 (20%)	1 (33.3%)	2
Total	5	3	8

Hazard ratio of cardiomyopathy among cirrhotic female patients with MELD score is HR: 1.67 OR=2 with 95% CI :(0.08 , 51.59), P>0.05(Not significant)

CONCLUSION:

- Cirrhotic cardiomyopathy affects 52 percent of cirrhotic individuals, according to case definitions based on a prolonged QTc interval.
- Male patient with MELD score above median value 10 has 49 times the odds of having cirrhotic cardiomyopathy than patients with less than 10 MELD score.
- In Female patient with MELD score above median value 10 has 2 times the odds of having cirrhotic cardiomyopathy than patients with less than 10 MELD score though the finding is not significant.
- Higher MELD score patients have Prolong QTc interval than Less MELD score can suggest prediction of cardiomyopathy in cirrhotic patients with high MELD score.

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