Gastroenterology



CLINICAL STUDY OF STRUCTURAL AND FUNCTIONAL CARDIAC ABNORMALITIES IN CIRRHOSIS OF LIVER

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ABSTRACT BACKGROUND: Cirrhosis of liver is a hyperdynamic condition in which there may be subtle cardiac dysfunction . objective of this study was to ascertain the structural and functional cardiac abnormalities that may be present with

cirrhosis of liver. AIMS AND OBJECTIVES:

- To evaluate the clinical aspects of cirrhosis pertaining to cardiac abnormalities.
- To ascertain the relation between cirrhosis of liver and its effect on cardiac function and structure.

METHODOLGY:

50 patients with cirrhosis of liver detected and proven by ultrasound abdomen were subjected to clinical examination and 2D echo to screen cardiac abnormalities. E/A ratio and LV mass were calculated to check for functional and structural abnormalities respectively. **RESULTS:** Male to female ratio 31:19, mean age 55.64±10.02, common clinical features – Fatigue (90%), abdominal distension (74%), abdominal pain (74%), icterus (76%). Mean E/A ratio 0.89±0.16 and mean LV mass 169.30±26.04, with EF 64.53±0.97. **CONCLUSION:** All patients with cirrhosis of liver must be screened for latent structural (LV mass) and functional (E/A ratio) cardiac abnormalities. Serum bilirubin >4.0 mg/dl, INR >2.0, Serum creatinine >2.0, associated with higher risk of cardiac abnormalities. Older age groups have a higher incidence of cardiac abnormalities.

KEYWORDS : Cirrhosis of liver , Cardiac abnormalities , E/A ratio , LV mass.

INTRODUCTION:

- Cirrhosis is a common hepatological disorder seen in clinical practice. Cirrhosis is a pathologically defined entity that is associated with a spectrum of characteristic clinical manifestations. Advanced liver cirrhosis is associated with an increase in blood volume, a reduction in systemic vascular resistance, and an increase in cardiac output.
- How this hyperkinetic circulation affects cardiac function and structure has been incompletely described, however. That is, while evidence has been produced that left ventricular systolic function is usually normal at rest in cirrhotic patients, scanty information is available on whether this applies to diastolic function and cardiac structure as well.
- This is of pathophysiological relevance because in other diseases diastolic function has proved to be an early marker of cardiac structural abnormality3 that in advanced cirrhosis may be favoured by the influence that stimulation of the reninangiotensin-aldosterone and the sympathetic nervous systems exerts on tissue growth.
- Hence, this study will evaluate the clinical aspects of cirrhosis, its effect on cardiac functions and structure by means of echocardiogram.

AIMS AND OBJECTIVES:

- To evaluate the clinical aspects of cirrhosis pertaining to cardiac abnormalities.
- To ascertain the relation between cirrhosis of liver and its effect on cardiac function and structure.

NUMBER OF CASES: 50

30

DESIGN OF THE STUDY: Descriptive statistical analysis has been carried out in the present study.

METHOD OF COLLECTION OF DATA:

Total of 50 patients of age group > 18 years were studied with regards to both history and clinical examination.

INVESTIGATIONS FOR DIAGNOSING OP COMPOUND POISONING: In this study for 2D ECHO machine, with Adult

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Cardiac probe Electronics Phased Array probe with 512 electronic independent channels along with 2D and M mode.

RESULTS:

Total 50 patients of age group >18 years, diagnosed as Cirrhosis of liver were studied thoroughly with regards to both history and clinical examination. The observations of study were as follows,

1.AGE DISTRIBUTION

Age distribution ranged widely with youngest patient being 38 years and oldest patient of 78 years. Cirrhosis and SBP was seen predominantly in older age group with 94% of patients >40 yrs, of which 66 % were in between 41 and 60 yrs of age. Mean age was 56 years.

2.ECG CHANGES

Of the 23 cases with ECG changes 20 had long QTc intervals, and the other three with non significant ST elevation changes. QTc i.e. heart rate corrected QT interval was calculated using Bazetts formula.

$$QTc = \frac{QT}{\sqrt{RR}}$$

Abnormal QTc was defined as above 440ms.

3.ECHO

The LAD and LVED were above normal limits in all patients of the study group, with the mean value for LAD being 39.96 ± 1.34 mm and that of LVED being 40.38 ± 1.03 mm, which directly reflects on the LV mass.

4.2D ECHO Parameters

LV mass in 66 % of the patients were more than normal limits (male >170 gms and female >160 gms), with a mean value of 169.30 ± 26.04 gms.

The e/a ratio in 96 % of the patients are <1.3 for male and <1.2 for female with 98% of the group having an E/A ratio of less than or equal to 1. Mean value of E/A ratio was 0.89 ± 0.16 .

5.ALCOHOL CONSUMPTION AND LV MASS

LV mass of patients did not show any significant statistical correlation with alcohol consumption as 70.6 % of the patients with normal LV mass consumed alcohol and 72.7% of those who had abnormal LV

mass had h/o alcohol consumption. The reasoning for the same could be because of the lower percentage of patients who did not consume alcohol in the study group.

6.Clinical features in cirrhosis

The most common mode of presentation was fatigue with jaundice, abdominal distension and abdominal pain.

In this series 90 % of the patients gave complaints of fatigue and 70 % with complaints of fatigue, jaundice and abdominal distension.

Only 44% of the patients (22 cases) had complaints of chest pain of which most were retrosternal, burning type of pain and had previous episodes of the same for which they were treated as acute gastritis. Even so, 82% (18 cases) of this group had abnormal LV mass findings indicating that, many patients with cirrhosis of liver may or maynot present with any cardiac signs or symptoms and should be subjected to careful cardiac evaluation and 2D ECHO.

Incidence of hematemesis and breathlessness were quite low as comparable to other studies.

Clinically all the patients moderate to severe ascites, of which 40% had tense ascites and in the rest shifting dullness could be elicited. Icterus was seen in 74 % of the cases Signs of liver cell failure were noticed only in 12 % of the cases of which correlation with structural or functional cardiac function was not significant. Hence highlighting the importance of cardiac screening in patients who present with minimal or no signs of liver cell failure.

DISCUSSION:

The most predominant cause of cirrhosis of liver in this study was alcoholism with 72 % of the study population being alcoholics for more than 15 yrs. The rest 28 % of the population consisted of chronic hepatitis patients (18%) and other unknown causes of cirrhosis.

CHILD PUGH'S SCORE AND MELD'S CRITERIA TO PREDICT SEVERITY OF CARDIAC ABNORMALITY

All the patients in the study group had Child Pugh's classification CLASS C . While the child Pugh's score correlation with cardiac structural and functional abnormalities did not reach any level of significance, the MELD score showed increasing severity of cardiac abnormalities as the score rose above 40.

This probably due to the fact that MELD criteria score being calculated on the serum bilirubin, INR and serum creatinine levels, rise in these factors directly causes deterioration in cardiac functionality.

ECG CHANGES AND CARDIAC ABNORMALITIES IN CIRRHOSIS

In the study population 46 % (23 cases) had ECG changes, of which 20 cases had long QTc intervals.

These cases showed a significant correlation with cardiac deformities in accordance with the Bernadi et al study [26]. .Long QTc is associated with sudden death due to arrhythimias.

Hence careful cardiac evaluation of those with long QTc intervals is mandatory as they are in the high risk for cardiac abnormalities which may not be picked up clinically.

ECHOCRDIOGRAPHIC PARAMETERS IN CIRRHOSIS

The LAD and LVED were above normal limits in all patients of the study group, with the mean value for LAD being 39.96±1.34 mm and that of LVED being 40.38±1.03 mm. which directly reflects on the LV mass as is shown in the studies my Wong et al [15] and Pozzi et al [28].

LVEF was normal in all the patients of the study group, with mean value of 64.53±0.97%, similar to results in same above mentioned studies. This paradoxical normal EF value in the face of diastolic dysfunction could probably be because of normal pre and afterload of the cirrhotic heart as explained by Muller et al. [30]

LV mass was significantly raised in 66 % of the study population with a mean value of 169.30±26.04 gms, which is accordance with the wong et al study along with E/A ratio being ≤ 1 in 96 % of the population .

The major cardiac structural abnormality of the myocardium in such patients was myocardial hypertrophy. One possible explanation for

this would be myocardial adaptation to a chronically elevated blood volume.

Alternatively, ventricular hypertrophy or remodeling could be related to the trophic effects of activated neurohormonal systems such as noradrenaline, or angiotensin II with or without the synergistic effects of endothelin-1

Studies have proven that there is E/A normalization in patients that receive liver transplant.

CONCLUSION:

- Patients with cirrhosis, who have overt cardiac dysfunction, may or may not manifest clinically with symptoms or signs.
- patients with cirrhosis of liver should be screened for structural and functional cardiac abnormalities, irrespective of age, sex or cause of cirrhosis.
- Increased levels of serum bilirubin, INR and serum creatinine are associated with higher degree of cardiac abnormalities.
- Increase in MELD's criteria score is directly proportional to the increase in risk of cardiac abnormalities.
- Patients who are on transplant recipient list should be screened for latent cardiac abnormalities, so as to prevent death due to arrhythmias.
- Patients with structural or functional cardiac abnormalities before transplant should be closely monitored for worsening of cardiac function after the transplantation of liver.
- Cirrhosis was seen predominantly in older age group with 94% of patients >40 yrs, of which 66 % were in between 41 and 60 yrs of age.
- Cirrhosis of liver was predominantly seen in males i.e. 31 cases (62%) compared to females 19 cases (38%).
- The commonest cause of cirrhosis was chronic alcoholism, followed by viral hepatitis.
- Most common presenting symptoms were fatigue, abdominal distension, followed by abdominal pain and icterus.
- All patients had free fluid in abdomen which was moderate to massive in extent.
- Jaundice was the commonest clinical sign, followed by abdominal distension.
- ECG changes seen in 44 % of the cases were long QTc interval
- Functional cardiac dysfunction (96%) was higher compared to • structural cardiac abnormality (66%).

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