VOLUME - 9, ISSUE - 12, DECEMBER - 2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Medical Science

COMPARATIVE STUDY OF LV MASS ABNORMALITY, EJECTION FRACTION ABNORMALITY AND ABNORMAL E/A RATIO BETWEEN ALCOHOLIC AND NON ALCOHOLIC CIRRHOTICS

Dr Bharathraj M.Y

ABSTRACT

Background : In case of ischemic hepatic disease, patients with severe heart failure usually remain asymptomatic, while for patients with congestive hepatopathy, signs of right-sided heart failure could mask hepatic injury. However, changes in hepatic function, that are proven by laboratory tests are significant in predicting the survival of patients with severe heart failure. There is possible considerable changes in the involvement of cardiac morbidity among both alcoholics and non alcoholics. This study evaluates the cardiac profile of cirrhotic individuals with respect to their alcohol consumption. **Materials and methods :** It is a comparative cross sectional study carried out at Medical department of SSIMS and RC, a tertiary medical institute in central part of the Karnataka. Study randomly selected patients with cirrhosis which comprised of 50 alcoholics and 50 non alcoholics. A normal group of 50 individuals without history of alcohol consumption and cirrhosis were selected for secondary comparison. Non Probability Purposive Sampling Technique is used and data was analyzed using latest SPSS for windows. **Results :** ECHO revealed that all the patients with alcoholic and non alcoholic cirrhosis had abnormal LVIDd (>56mm). LV mass abnormality was found among 76% of patients with non alcoholic cirrhosis compared to 66% of patients with alcoholic cirrhosis. High Ejection fraction abnormality was found among only 4% of patients with non alcoholic cirrhosis. The abnormal E/A ratio was observed among 8% of patients with non alcoholic cirrhosis compared to 4% of alcoholic cirrhosis patients. **Conclusion :** 2D Echocardiography showed increase in LAD, LVIDd and LV mass among cirrhotic patients thereby suggesting definitive cardiac involvement. The cardiovascular abnormalities did not show much differences between the alcoholic and non alcoholic patients. all cirrhotic patients irrespective of their aetiology has to undergo a cardiovascular evaluation.

KEYWORDS : "2D echo, Cirrhosis, Alcoholics, Ventricular hypertrophy

INTRODUCTION

The heart and liver are organs that are closely related both in health and disease. Avicenna pointed to some of the interactive effects occurring in the heart and the liver. Some of the most important include: (1) dominance of the "heart warmth" over "liver coldness" and (2) the dominance of "liver dryness" over "heart wetness". The impact and position of "heart temperament" as well as its effect on "liver in temperaments" may be definitive in diagnosis and assessment of the general prognosis of liver disease and in the treatment process[1,2] Chronic liver diseases may affect cardiac functions in the absence of other heart disease. These effects are called cirrhotic cardiomyopathy and may aggravate the course during orthotropic liver transplantation (OLT). Most of these effects are reversed after OLT [3,4] Patients with liver cirrhosis (LC) frequently experience autonomic cardiovascular dysfunction, such as increased activity of the sympathetic nervous system and reduced vagal cardiac function, which has important implications for liver dysfunction and poor survival[5]. Baroreflex has been shown to be an important determinant of electrical stability in the heart and can predict increased mortality and end-organ damage[6]. Patients with liver cirrhosis have an enhanced activity of the sympathetic nervous system and hyperdynamic circulation showing increased cardiac output and reduced systemic vascular resistance. These changes may induce myocardial remodelling and LV hypertrophy (LVH), resulting in systolic and diastolic functional abnormalities and cardiomyopathy[7]. Diastolic dysfunction in cirrhosis is due to an increased stiffness of the myocardial wall owing to myocardial hypertrophy, fibrosis, and subendothelial edema. The prevalence of diastolic dysfunction has been reported to range from 45% to 56%. Diastolic dysfunction is most prominent in patients with severe decompensation, in whom, the combination of myocardial hypertrophy, contractile dysfunction, changes in heart volumes, and diastolic dysfunction may represent an essential element in cardiomyopathy[8]. Patients with advanced cirrhosis usually exhibit tachycardia. The inability to increase the heart rate further contributes to an impaired ability to keep the cardiac output at a level adequate to meeting the needs of systemic circulation. At this point, the effective volemia suddenly worsens, similar to the events of post-paracentesis circulatory dysfunction and hepatorenal syndrome[9]. The prolongation of the electrocardiographic QT interval is common in cirrhosis, with a prevalence that exceeds 60% in patients with an advanced disease. In this case, drugs affecting QT should be avoided or used with caution and under close ECG monitoring [10].

Aims and objectives

To compare the characteristic cardiac features between alcoholic and non alcoholic cirrhotics. To ascertain weather any positive benefits of alcohol consumption in cardiac hydrodynamics in patients with alcoholic cirrhosis.

Materials and methods

a) Inclusion criteria - All patients with cirrhosis of liver presenting to medical OPD and 50 patients without cirrhosis was taken as controls.

b) Exclusion criteria - Patients with other known aetiology of cardiac disease, Patients with severe anemia, GI bleed, hepatorenal syndrome, and with HIV infections were excluded.

Methods and statistics - Non probability purposive sampling technique was used. Semi structured questionnaire was used to collect the relevant data. 3.5 MW Mechanical Probe USG machine was used to diagnose cirrhosis of liver and ascites giving special reference to caudate lobe, portal vein, and spleen. 2D Echo machine, with Adult cardiac probe electronics phased array probe with 512 electronic independent channels along with 2D and M mode was used. To assess the cardiac structure in special reference to left ventricular end diastolic diameter, inter-ventricular septal thickness, left ventricular posterior wall thickness and M mode to asses E/A ratio, which is E velocity, is early maximal ventricular filling velocity, and A velocity is left diastolic or atrial velocity. Chi square test is primary mode to compare the overall proportion and to compare mean values Independent "t" test was used.

RESULTS

Totally 150 study subjects were considered for the study and

among them, 50 patients with alcoholic cirrhosis, 50 patients with cirrhosis of non alcoholic etiology and 50 persons without cirrhosis as controls. Non alcoholic cirrhotics were positive for hepatitis B among 25 cases, posiotive for HepatitisC in 20, Four were having steotohepatitis and one with cryptogenic etiology. Among patients with alcoholic cirrhosis, majority of patients belong to the age group of 41 – 60 years (66%) followed by 61 – 80 years (28%) and 18 – 40 years (6%). Among patients with Non- alcoholic cirrhosis, majority of patients belong to the age group of 41 – 60 years (50%) followed by 61 – 80 years (38%) and 18 – 40 years (6%). Among Controls, majority of them belong to the age group of 41 – 60 years (64%) followed by 61 – 80 years (20%) and 18 – 40 years (16%). Distribution of gender revealed that, among patients with alcoholic cirrhosis, males constituted 90% and female 10%. Among patients with Non- alcoholic cirrhosis, males constituted 52% and female 48%. Among Controls, males constituted 56% and female 44%. The ECG findings among alcoholics were showing low voltage complex in 10% of cases, long QT in 3%, Left Atrial Enlargement in 8%, Left Ventricular Hypertrophy in 16% and ST,T Changes in 10% of the cases. Among non alcoholic patients, the low voltage complex was 4%, Long QT in 2%, Left Atrial Enlargement in 7%, Left Ventricular Hypertrophy in 16% and ST,T changes in 16% of the cases. ECHO revealed that all the patients with alcoholic and non alcoholic cirrhosis had abnormal LVIDd (>56mm). LV mass abnormality i.e Abnormal (M>170gm/m2, F>160gm/m2) was found among 38 (76%) of patients with non alcoholic cirrhosis compared to 33 (66%) of patients with alcoholic cirrhosis. LV mass abnormality in control group were 06 (12%) of the cases. Among patients with alcoholic cirrhosis, abnormal LV mass was more commonly found in 41 - 60 years (38%) and 61 - 80 years (26%). Among patients with non alcoholic cirrhosis, abnormal LV mass was more found in 41 - 60 years (42%) and 61 - 80 years (30%). (Table 1)

Table 1: Age and LV mass

Age group	A		B		C	
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal
18 – 40 years	02 (04%)	01 (02%)	04 (08%)	02 (04%)	08 (16%)	00
41 – 60 years	14 (28%)	19 (38%)	04 (08%)	21 (42%)	30 (60%)	02 (04%)
61 – 80 years	01 (02%)	13 (26%)	04 (08%)	15 (30%)	06 (12%)	04 (08%)
Total	17 (34%)	33 (66%)	12 (24%)	38 (76%)	44 (88%)	06 (12%)

Among alcoholic cirrhosis high mean E/A ratio was found in 18-40 years of age (1.2) where as among non alcoholic patients it was 9. (Table - 2)

Table 2 : Age and Mean E/A ratio

Age group	A		B		C	
	Mean	SD	Mean	SD	Mean	SD
18 – 40 years	1.20	0.4	0.90	0.1	0.86	0.2
41 – 60 years	0.89	0.1	0.85	0.1	0.87	0.1
61 – 80 years	0.87	0.1	0.87	0.1	0.85	0.2

DISCUSSION

These cases showed a significant correlation with cardiac deformities in accordance with the Bernadi et al study [11]. The comparison of ECG variations was statistically significant in comparison with the control subjects. The echo findings showed that in all patients in our study group,the value of LVIDd was more than 32,which was the value taken as the cut off. This shows that almost all cirrhotic patients will have some sort of cardiac enlargement during the course of the disease. As the follow up of the patients were not done,it was not able to assess the rate of progression and its rapidity. The machine calculated LV mass was abnormal in 71 of the cirrhotic patients as compared to 6 of the controls. Among this 33 of them were alcoholics and 38 were non alcoholics. This increased values among non alcoholics could be attributed to the etiologies which could cause concurrent cardiomyopathy and cirrhosis. The difference in LV mass was statistically significant as compared to the controls. The increase in LV mass was mostly among those in the age group 41-60 years,which could be explained by the increased number of subjects in that age group. The above findings were correlated with Francisco et all [12].

CONCLUSION

Significant cardiac abnormalities were noticed in cirrhotic patients of alcoholic and non alcoholic etiologies. The cardiovascular abnormalities did not show much differences between the alcoholic and non alcoholic patients. ECG variations,mainly in the form of low voltage complexes and QT prolongation were present in many cirrhotic patients irrespective of the etiology of cirrhosis. Electrocardiograph showed increase in LAD, LVIDd and LV mass among cirrhotic patients thereby suggesting definitive cardiac involvement. There was not much variation in the ejection fractions between the cirrhotics and normal patients. There is no benefit role of alcohol consumption on the cardiac morbidity when compared with the non alcoholic cirrhotics and with normal individuals. However the adverse outcome of cardiac events were more among cirrhotics compared to normal individuals.

REFERENCES

1. K Ebrahim. Liver heart inter relationship in fatty liver disease based on the Avicenna's Point of View. Iran J Public Health. 2013; 42(6): 648–649.
2. Fouad YM, Yehia R. Hepato-cardiac disorders. World Journal of Hepatology. 01 Jan 2014, 6(1):41-54.
3. X Andrew et all. Heart Failure and Liver Disease: Cardiohepatic Interactions. JACC: Heart Failure, Volume 7, Issue 2, February 2019, Pages 87-97.
4. A Q Adegboyega. Effect of cirrhosis and liver transplantation on the gender difference in QT interval. The American Journal of Cardiology, April 2005, 95(5):691-4
5. S Jun-Gol. Changes in Cardiovagal Baroreflex Sensitivity Are Related to Increased Ventricular Mass in Patients With Liver Cirrhosis. Official Journal of the Japanese Circulation Society, Vol.76, December 2012, 2807-13.
6. O Norihiro. Baroreflex Sensitivity Predicts Cardiovascular Events in Patients With Type 2 Diabetes Mellitus Without Structural Heart Disease. Circulation Journal, April 2010, 74(7):1379-83.
7. F Yasser Mahrous. Hepato-cardiac disorders. World Journal of Hepatology, 2014 January 27; 6(1): 41-54.
8. K Michael. Diastolic Dysfunction in the Presence of Left Ventricular Systolic Dysfunction: Implications of alpha-Adrenergic Blocking Therapy. Congestive Heart Failure, March 2001, 7(2):71 - 76.
9. P Salvatore. Management of ascites and hepatorenal syndrome. Hepatology International, Feb 2018;12(Supplement 1):122-134.
10. M Søren. Interactions of the heart and the liver. European Heart Journal, Volume 34, Issue 36, 21 September 2013, Pages 2804–2811
11. Bernardi M, Calandra S, Colantoni A, Trevisani F, Raimondo ML, Sica G, et al. Q–T interval prolongation in cirrhosis: prevalence, relationship with severity and etiology of the disease and possible pathogenetic factors. Hepatology 1998;27:28–34.
12. Francisco Sampaio, Joana Pimenta. Left ventricular function assessment in cirrhosis: Current methods and future directions. World J Gastroenterol. 2016 Jan 7; 22(1): 112–1