



Study Of Electrocardiography And Echo Cardiography Changes In Alcoholic Liver Disease And Its Correlation With Liver Function Tests

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Abstract

Introduction

Alcohol is the 3rd most common risk factor of disease burden in the World. Alcohol consumption leads to 2.5 million deaths annually. Clinically, there are three stages of Alcoholic Liver Disease. Fatty liver, Hepatitis, Cirrhosis. ^(1,2) Electrocardiography and Echocardiography changes are most commonly seen in these patients due to the effect of alcohol in cardiovascular system.

Aim

To study ECG and Echocardiography changes in different stages of Alcoholic Liver Disease and to correlate these changes with Liver Functions Tests.

Materials & Methods

It was a cross-sectional observational study conducted among 60 cases who were diagnosed to have ALD. These patients were subjected to ECG and Echocardiography

studies and the changes were observed and correlated with LFTs

Results and Discussion

Out of 60 cases, 10 were Fatty liver, 20 were Hepatitis, 30 were Cirrhosis cases. The Liver function tests were significantly deranged in cirrhosis cases. Among all cases, cirrhosis cases were having significant ECG abnormalities i.e., PR segment shortening (140.63 m Sec) QTc prolongation (493.17 m Sec). Echocardiography findings showed significant abnormalities in cirrhosis cases.

Conclusion

Out of all the three stages of ALD, cirrhosis cases showed significantly deranged LFTs as well as ECG and Echocardiography changes than fatty liver and hepatitis cases.

Introduction

Alcohol is the 3rd most common risk factor of disease burden in the World. The alcohol consumption leads to 2.5

million deaths annually. The association of alcohol with cirrhosis was first recognised by *Matthew Baillie*^(1,2). Among the Liver Diseases, Alcoholic Liver Disease is the 4th commonest causes of deaths in the world under 65 years of age. Alcoholic Liver Disease describes a spectrum of clinical diseases and pathologic changes in individuals who are consuming alcohol excessively in a very long time in their life-time.

In males, 40 – 80gm/day of alcohol causes fatty liver disease, around 160 gm/day for almost 10 – 20 years develops hepatitis. Among them, only 10 – 15% develops Alcoholic Liver cirrhosis who continued to consume alcohol. Women exhibit increased susceptibility to alcoholic liver disease at amounts >40 – 60 gm/day.⁽¹⁾

Clinically, there are three stages of Alcoholic Liver Disease. Fatty liver, Hepatitis, Cirrhosis. Among all heavy drinkers, who have evidence of fatty liver disease, 10 – 35% develops hepatitis, and 5 – 15% who continued to have heavy consumption of alcohol develops cirrhosis⁽³⁾.

Most important findings in ECG in the chronic alcoholic persons during moderate exercise include significant changes in ST, QT, and QTc intervals. The majority of Echocardiographic changes were found among cirrhosis cases for example, LV systolic dysfunction, Dilated cardiomyopathy.⁽⁴⁻⁸⁾ This study was mainly focused on ECG and Echocardiographic changes in different clinical stages of ALD.

Aims

To study the ECG and Echocardiography abnormalities in different types of ALD and its correlation with LFTs.

Materials & Methods

This is a cross sectional observational study conducted in Department of Medicine, Dr. D Y Patil medical college, hospital and research center, pimpri, Pune. A total of 60 cases were taken who were diagnosed with ALD. 10 cases – fatty liver, 20 – hepatitis, 30 – cirrhosis. After taking the

permission from institutional ethical committee, all cases were subjected to ECG and Echocardiographic studies. Liver Functions were done.

Inclusion criteria

All patients of Age >18years.

All patients diagnosed as Alcohol Liver Disease on Ultrasonography (USG).

All the stages of Alcoholic Liver Disease -

1. Alcoholic Fatty liver disease.
2. Alcoholic hepatitis.
3. Alcoholic Liver cirrhosis.

Exclusion criteria

Known cases of Ischemic Heart Disease.

Pregnant women

All cases of Liver Diseases due to Infections, Drug induced, Autoimmune disease

Immunocompromised patients such as HIV, patients on Steroid therapy.

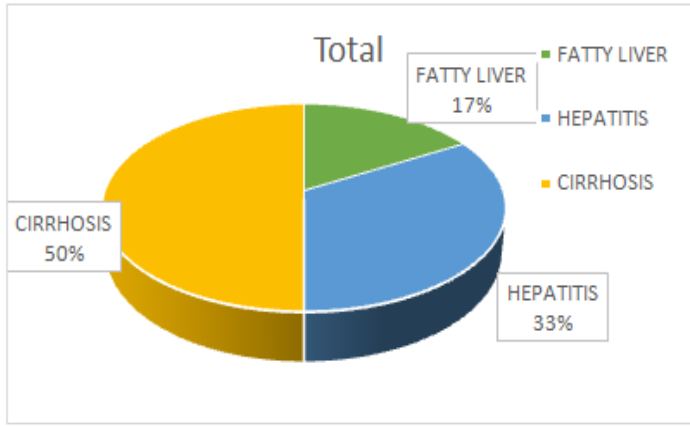
Statistical analysis

The data was analyzed using social science statistics software web version. The graphs and tables were prepared using Microsoft Word and Excel (2010).The one-way analysis of variance (ANOVA) was used to determine whether there are any statistically significant differences between the means of the three independent groups. Chi-square test was used to test whether distributions of categorical variable differ from each another. P value was considered as significant if lesser than 0.05 at 95% confidence interval.

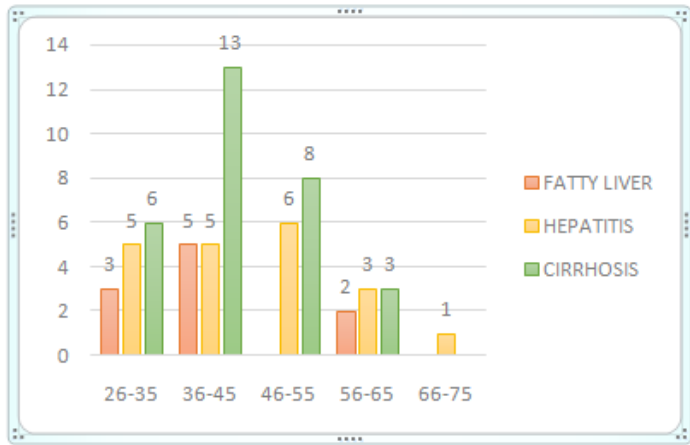
Results & Discussion

Out of 60 cases, 10 (17%) cases had fatty liver, 20 (33%) cases had hepatitis, 30 (50%) cases had cirrhosis.

Graph 1 – Distribution of cases according to type of Alcoholic Liver Disease



Graph 2 - Age wise distribution of cases



Most of the cases were seen among 36 – 45 age group, and also cirrhosis cases were mostly seen in them.

Table 1 – Liver Function Tests parameters (Bilirubin levels) in Types of ALD

	FATTY LIVER	HEPATITIS	CIRRHOSIS	P value
Total. BILIRUBIN	1.73	4.29	3.51	P<0.001*
Direct. BILIRUBIN	0.57	1.55	1.30	P<0.001*
Indirect. BILIRUBIN	1.17	2.69	2.20	P<0.001*

***P < 0.05 significantly higher in Cirrhosis group**

This table shows Liver Function Tests parameters (Bilirubin levels) in different types of ALD. It shows there are significantly higher values in cirrhosis group than fatty liver and hepatitis group.

Table 2 – Liver Function Tests parameters (Liver Enzymes) in Types of ALD

	FATTY LIVER	HEPATITIS	CIRRHOSIS	P value
SGOT/AST	28.2	68.35	467.9	<0.001*
SGPT/ALP	26.6	46.9	270.9	<0.001*
ALP	105.5	128.3	271.5	<0.001*

***P<0.05 significantly higher in cirrhosis**

The above table shows the Liver Function tests parameters (Liver enzymes), in different types of ALD cases. It is showing that, there are significantly higher values in cirrhosis group, since the P-value is less than 0.001.

	FATTY LIVER	HEPATITIS	CIRRHOSIS	P value
P wave (mS)	83.10	79.50	79.83	0.59 NS
PR SEGMENT	171.60	148.15	140.63	0.022*
QRS	61.90	66.45	68.73	0.437 NS
QTC	414.00	413.30	493.17	<0.001*

Table 3 – ECG Parameters in various Types of ALD

***P<0.05significantly longer in those with fatty liver**

This table shows the ECG parameters in different types of ALD. PR segment is significantly shorter in cirrhosis group 140.63. QTc is prolonged 493.17 which is significantly higher in cirrhosis group.

Table 4 – 2D Echo Cardiography Findings in various Types of ALD

TYPE OF ALD	NORMAL FINDINGS	ABNORMAL FINDINGS	Grand Total
FATTY LIVER	100%	NIL	100.00%
HEPATITIS	80%	20%	100.00%
CIRRHOSIS	66.67%	33.33%	100.00%

This table shows the 2D Echocardiography findings in different types of ALD. It was observed that 2D echocardiography was normal in all patients of fatty liver. 80% of patients had normal findings where as 20% had abnormal findings in Hepatitis patients. in Cirrhosis patients, 66.67% had normal findings, 33.33% had abnormal findings.

In our study, it was observed that 50% cases taken were cirrhosis. LFTs were significantly deranged among cirrhosis cases as seen in the study conducted by *Sayantana Ray et al.*⁽⁹⁾, *K.V. Narayanan Menon et al.*⁽¹⁰⁾

ECG parameters observed were PR segment shortening and QT prolongation was seen. It was observed that PR segment was 171.60 mS in fatty liver cases, 148.15 in hepatitis cases, 140.63 in cirrhosis cases which was significantly shorter in cirrhosis group. QTc in fatty liver cases was 414.0, in hepatitis cases 413.30 whereas in Cirrhosis cases it was 493.17 which was prolonged. The findings are consistent with the study conducted by *Milovanovic B et al.*⁽¹¹⁾

Abnormal findings were seen in assessing 2D Echocardiography of the participants. Abnormal findings like, dilated cardiomyopathy, mild LVH, trivial MS, MR, mild PAH, Grade 1 Diastolic dysfunction, ejection fraction <60% were observed. There were no abnormal findings noted in fatty liver cases. Out of 20 cases, 80% of them were normal only 20% were showing abnormal 2D echo findings. In cirrhosis cases, out of 30 cases, 66.67% were showing normal 2D Echo findings whereas 33.33% were having the above mentioned abnormal findings. The results were similar to the study done by *Piyush O Somani et al.*⁽¹²⁾

Conclusion

In this study, 50% of the cases taken were having cirrhosis among different stages of ALD. It was seen that LFTs were significantly deranged among the cirrhosis. It was also observed that ECG and Echocardiography abnormalities were more significantly seen in cirrhosis cases. So it is concluded that to prevent the abnormalities seen in cirrhosis cases, a strict abstinence of alcohol should be maintained and counsel the patients, to prevent the further progression of disease.

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