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Original Research Article

# A Study of Serum Lipid Profile in Patients with Chronic Alcoholic Liver Diseases in Tertiary Care Level Hospital, Ahmedabad

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**Abstract:**

**Background:** Excessive alcohol consumption causes a wide variety of medical and social problems and a considerable economic burden. Liver is the principal site for formation and clearance of lipoproteins. Liver diseases can affect serum lipid levels in a variety of ways. The aim of this study is to determine the changes in levels serum lipid profile in chronic alcoholic liver diseases.

**Materials and Methods:** A cross-sectional study was done and included 100 individuals (50 chronic alcoholic liver diseases cases and 50 normal controls). Serum Lipid profile estimated by colorimetric method on fully automated chemistry analyzer.

**Result**: Data were fed under Microsoft Excel 2007 and statistically analyzed by Graph pad software; Version 6.0, which evaluated the differences of various parameters in both groups on the basis of p value. In Serum triglyceride and VLDL level, there was no significant change, serum cholesterol; HDL and LDL level was significantly decreased in chronic alcoholic liver diseases patients as compared to normal healthy controls.

**Conclusion:** Estimation of serum Lipid Profile allows better assessment of hepatic synthetic function and evaluation of prognosis of patients with alcoholic liver disease. Hence these parameters should be regularly monitored in chronic alcoholic liver diseases patients.

**Keywords:** Chronic alcoholic liver diseases**,** Serum Lipid profile, Serum Triglyceride, Serum Cholesterol, Serum HDL, Serum LDL and Serum VLDL.



## Introduction

Better understanding of the physiological effects of ethanol and the mechanisms by which alcohol exerts its effects on different tissues would lead to improved diagnostics and treatment of alcohol use disorders [1]. The results of laboratory tests revealing excessive alcohol consumption and possible tissue injury could motivate patients more than a verbal report by a clinician.

Liver is the principal site for formation and clearance of lipoproteins. It receives fatty acids and cholesterol from peripheral tissues and diet, packages them into lipoprotein complexes and releases these complexes back into the circulation. Hence it is not surprising that liver diseases can affect serum lipid levels in a variety of ways [2].

## Materials and Methods

**Study setting, type and sample size:** In the present cross-sectional study, 50 cases of chronic alcoholic liver disease and 50 controls of normal healthy subjects were selected from Civil Hospital and B. J. Medical College, Ahmedabad, Gujarat. The study was conducted during the period of November 2015 to February 2017.

All patients were primarily evaluated by clinical examination and then confirmed by investigations for liver involvement due to alcoholism. Verbal informed consent taken from all participants during study.

**Study Groups:**

- Group 1 (Cases)– Chronic Alcoholic Liver Disease patients (50)
- Group 2 (Controls) – Normal healthy subjects (50)

**Inclusion Criteria for Group 1 (Cases):**

- Age: - 20 to 60 years

- Sex: - Males
- Patient with continuous alcohol consumption.
- Patients with clinical evidence of alcoholic liver dysfunction.

**Inclusion Criteria for Group 2 (Controls):**

- Age: - 20 to 60 years
- Sex: - Males
- Samples of fifty normal healthy volunteer individual (No clinical evidence of any disease)

**Exclusion Criteria for Both Groups:**

- Age < 20 or >60 years
- Athletes
- Clinical Evidence of current illness
- Clinical evidence of any chronic infection
- Smoking had not been allowed 1 hour prior to blood sample collection
- Protein energy malnutrition
- Post-operative patient
- Patient taking anticonvulsant therapy (Benzodiazepines, Phenobarbitone)

**Sample Collection:**

Venous blood was collected in clot activator serum vacutte from all the patients and control group by venepuncture. Serum was separated by centrifugation and analysis was done on Fully Automated Biochemistry Analyzer-Erba XL-640 at Hi-tech Clinical Chemistry Laboratory Services, Civil Hospital, and Ahmedabad. Commercially available ready to use reagent kits were used for estimation of various parameters. Following Laboratory Investigations were done in both the study groups.

**Laboratory Investigations:**

- Serum Triglyceride: Trinder's (GPO PAP) method Reference range: 35-170 mg/dL
- Serum Cholesterol: Trinder's (CHOD PAP) Method Reference range: 140-250 mg/dL
- Serum HDL-cholesterol: Direct enzymeric method Reference range: 40-85 mg/dL
- Serum LDL and VLDL-cholesterol: Calculated by using Friedewald's formula LDL-cholesterol=TC-(HDL+VLDL) VLDL cholesterol=TG/5 Reference range: LDL-cholesterol: 60-130 mg/dL, VLDL-cholesterol: 12-30 mg/dL

**Statistical analysis:**

Data was entered under Microsoft Excel 2007 and epi info 7.

Demographic data analysis was performed and unpaired t-test was used to show the significance of serum Triglyceride, Cholesterol, HDL, LDL and VLDL levels between cases and controls. The entire data were analyzed using the software Graph pad.

A p-value of <0.05 - statistically significant, p-value <0.001 - highly significant and $p \geq 0.05$ – No significant difference.

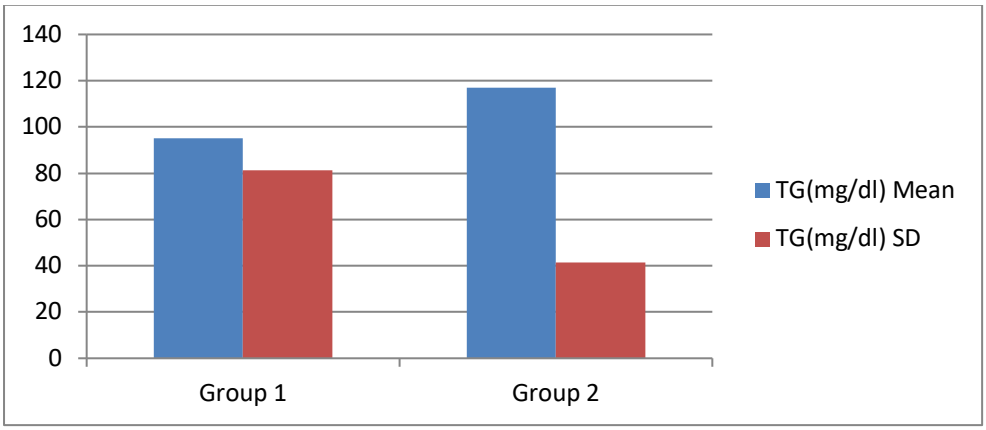
**Results**

**Table 1: Comparison of Mean activity of serum Triglyceride in Cases (group 1) & Controls (group 2)**

| Serum Triglyceride (mg/dl) | | |
|---|---|---|
| **Group** | **Mean±SD** | **p value** |
| Cases (group 1) | 95.18±81.31 | 0.09 |
| Controls (group 2) | 117.06±41.41 | |

Table 1 shows that there is no significant difference observed in serum triglyceride of cases and controls (95.18±81.31 mg/dl, 117.06±41.41 mg/dl respectively); p value = 0.09

Graphs 1: Showing comparison of Mean and SD of serum Triglyceride in Cases (group 1) & Controls (group 2)

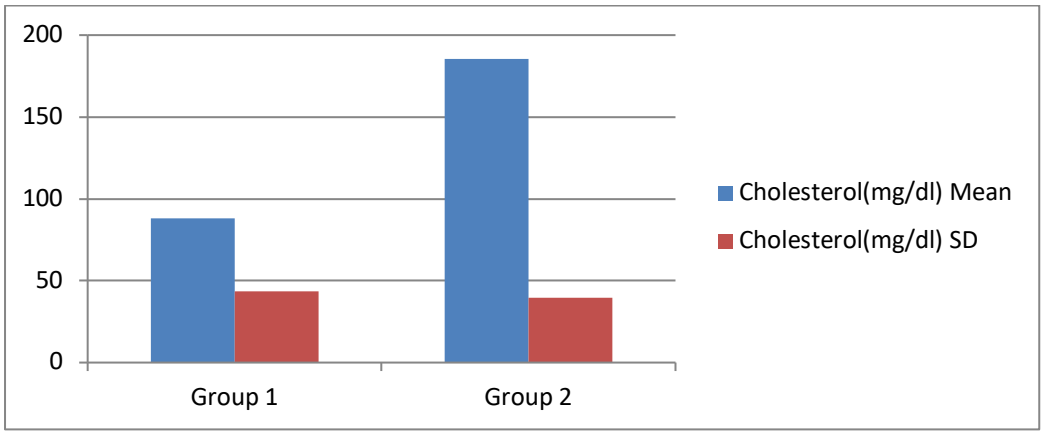



**Graph 1: Serum Triglyceride**

**Table 2: Comparison of Mean activity of serum Cholesterol in Cases (group 1) & Controls (group 2)**

| Serum Cholesterol (mg/dl) | | |
|---|---|---|
| **Group** | **Mean±SD** | **p value** |
| Cases (group 1) | 87.9±43.68 | <0.001 |
| Controls (group 2) | 185.64±39.78 | |

Table 2 shows that serum Cholesterol is decreased in cases as compared to controls (87.9±43.68 mg/dl, 185.64±39.78 mg/dl respectively). So, there is highly significant difference observed in between group 1 and group 2 of serum Cholesterol (p<0.001). Graphs 2: Showing comparison of Mean and SD of serum Cholesterol in Cases (group 1) & Controls (group 2)

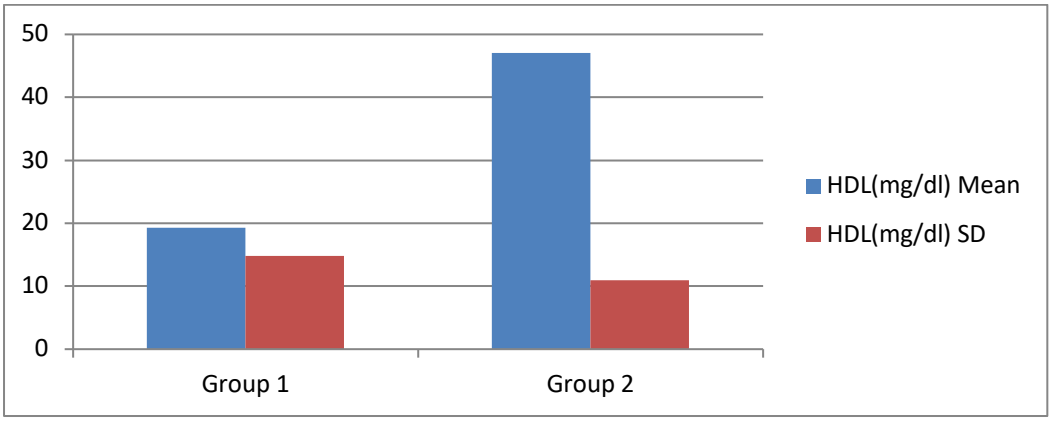



**Graph 2: Serum Cholesterol**

**Table 3: Comparison of Mean activity of serum HDL-cholesterol in Cases (group 1) & Controls (group 2)**

| Serum HDL-cholesterol (mg/dl) | | |
|---|---|---|
| **Group** | **Mean±SD** | **p value** |
| Cases (group 1) | 19.24±14.84 | <0.001 |
| Controls (group 2) | 47.08±10.98 | |

Table 3 shows that serum HDL-cholesterol is decreased in cases as compared to controls (19.24±14.84 mg/dl, 47.08±10.98 mg/dl respectively). So, there is highly significant difference observed in between group 1 and group 2 of serum HDL-cholesterol (p<0.001). Graphs 3: Showing comparison of Mean and SD of serum HDL-cholesterol in Cases (Group 1) & Controls (Group 2)



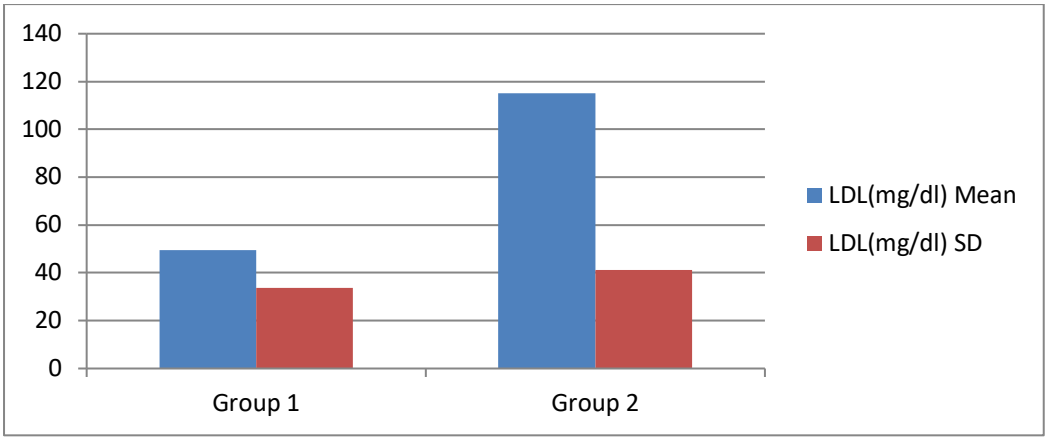

**Graph 3: Serum HDL-cholesterol**

**Table 4: Comparison of Mean activity of serum LDL-cholesterol in Cases (Group 1) & Controls (Group 2)**

| Serum LDL-cholesterol (mg/dl) | | |
|---|---|---|
| **Group** | **Mean±SD** | **p value** |
| Cases (group 1) | 49.61±33.84 | <0.001 |
| Controls (group 2) | 115.14±41.30 | |

Table 4 shows that serum LDL-cholesterol is decreased in cases as compared to controls (49.61±33.84 mg/dl, 115.14±41.30 mg/dl respectively). So, there is highly significant difference observed in between group 1 and

group 2 of serum LDL-cholesterol (p<0.001). Graphs 4: Showing comparison of Mean and SD of serum LDL-cholesterol in Cases (Group 1) & Controls (Group 2)

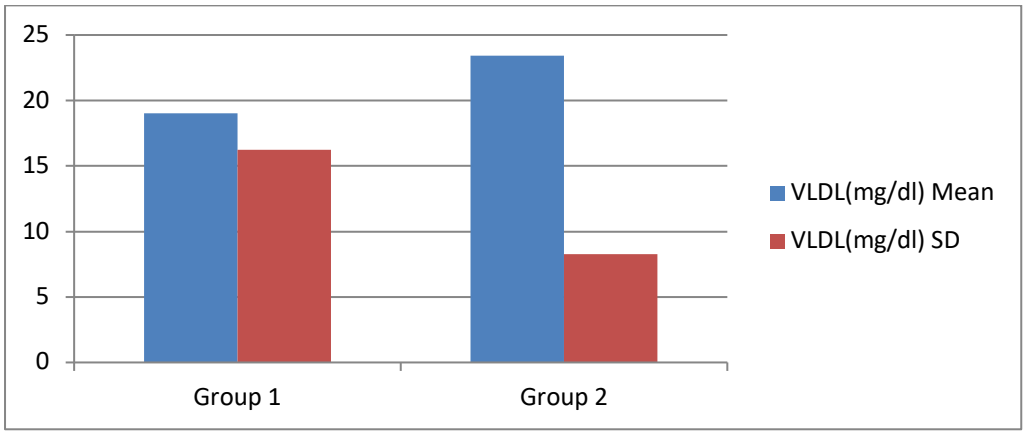



**Graph 4: Serum LDL-cholesterol**

**Table 5: Comparison of Mean activity of serum VLDL-cholesterol in Cases (Group 1) & Controls (Group 2)**

| Serum VLDL-cholesterol (mg/dl) | | |
|---|---|---|
| **Group** | **Mean±SD** | **p value** |
| Cases (group 1) | 19.03±16.26 | 0.09 |
| Controls (group 2) | 23.41±8.28 | |

Table 5 shows that there is no significant difference observed in serum VLDL-cholesterol of cases and controls (19.03±16.26 mg/dl, 23.41±8.28 mg/dl respectively); p value = 0.09. Graphs 5: Showing comparison of Mean and SD of serum VLDL-cholesterol in Cases (Group 1) & Controls (Group 2)




**Graph 5: Serum VLDL-cholesterol**

## Discussion

Liver is the largest internal organ of the body and it serves many important biological functions to sustain life, so early diagnosis of liver involvement is of utmost priority to prevent life threatening complications.

Over past decade a large number of new laboratory markers have emerged.

Chronic consumption of alcoholic beverages is a primary cause of liver injury [3]. Hence, an attempt has been made to evaluate the effect of chronic alcohol consumption on parameters, which can be affected by liver injury like Lipid profile.

Alcohol induced liver injury via alteration of lipid processing pathways, including fatty acid synthesis, uptake, oxidation and export from the liver [4,5]. Tracer studies in humans 6 have also demonstrated an alteration in de-novo lipogenesis resulting from alcohol consumption leading to altered liver and plasma lipid concentrations. In this study, serum lipid profile (TG, Cholesterol, HDL-cholesterol, LDL-cholesterol & VLDL-cholesterol) in case group and control group correlated well with the study done by Dr. Krishna Malik et al (2016) [7].

## Conclusion

The present study was aimed to evaluate the changes in serum Lipid profile in patients with chronic alcoholic liver diseases.

Level of Serum cholesterol, HDL and LDL was significantly decreased and there was no change in level of serum triglyceride and VLDL in chronic alcoholic liver diseases as compared to normal individuals. Estimation of serum Lipid Profile allows better assessment of hepatic synthetic function and evaluation of prognosis of patients with alcoholic liver disease.

Regular monitoring of lipid profile, especially in alcoholic patients is necessary for better patient management and to minimize the morbidity and mortality related to liver injury.

**Acknowledgement**

Staff of Biochemistry department of college and patients.

**Ethical Clearance**

Ethical clearance permission taken from institutional ethics committee of B.J.Medical College and Civil Hospital, Ahmedabad. (Ref. No. IEC/ Certi/42/17 on 8th May, 2017)

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