

## Serum Gamma Glutamyl Transferase Activity in Alcoholic Liver Disease

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### Abstract

### Original Research Article

Alcohol has now become one of the major socio - medical problem due to its excessive consumption in the world. Alcoholism is a major health problem in India and a high mortality rate is seen among Alcoholic liver disease patients. It is a reliable diagnostic marker of alcohol ingestion which is one of the most sensitive biochemical markers of alcoholic liver disease. This is a case control study carried out at a government tertiary care hospital in north Tamilnadu with a total study population of 120 subjects. Out of 120, 40 were healthy controls and 80 were alcoholic liver disease patients divided into two groups, alcoholic hepatitis in group I and alcoholic cirrhosis in group II. A significant correlation in the level of serum GGT is observed in alcoholic hepatitis ( $231.50 \pm 38.63$ ) and alcoholic cirrhosis ( $91.73 \pm 15.76$ ) when compared with the normal subjects ( $17.88 \pm 0.84$ ) with p value ( $p < 0.05$ ). Among the alcoholic hepatitis and the alcoholic cirrhosis patients both shows a raise in serum GGT level, but its level shows a fall in alcoholic cirrhosis patients. Measurement of serum GGT appears to be a sensitive marker of alcoholic liver disease.

**Keywords:** Serum Gamma Glutamyl Transferase, Alcoholic liver disease, Alcoholic hepatitis.

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## INTRODUCTION

Alcohol production and drinking was found to be in practice even in early Neolithic period (5,000 BC), which was proven by finding the remains of wine making equipment dated to that period [1]. Alcohol has now become one of the major socio - medical problem due to its excessive consumption in the world. Epidemiological data shows that 5% of people in general population or 10% adult male in general population are alcoholics [2]. Chronic alcohol consumption affect most of the organs in the body, dose related damage to liver cause alcoholic liver disease. The general marker of alcoholism and alcoholic liver disease used in practice are Aspartate transaminase (AST), Alanine transaminase (ALT), Gamma glutamyl transferase (GGT), Glutamate dehydrogenase (GDH), Mean corpuscular volume (MCV), Serum Bilirubin, Prothrombin time and Albumin, some newer markers introduced is carbohydrate deficient transferrin, m-AST, Glutathione-s-transferase.

Serum GGT is one of the best markers for chronic alcohol consumption, which has a relatively high sensitivity and specificity [3]. High levels of serum GGT are observed in patients with severe alcoholic liver disease though they may decrease in the later stages of liver cirrhosis [4]. As serum GGT is a known marker of alcohol consumption in this study serum GGT is measured in the alcoholic liver disease patients

and control group and compared. The alcoholic liver disease patients are further grouped into alcoholic hepatitis and alcoholic cirrhosis and the serum GGT values are compared between these two groups. Any variation in the elevation of serum GGT among two groups can be used to diagnose these two conditions.

## MATERIALS AND METHODS

A case control study was carried out at a government tertiary care hospital in north Tamilnadu for a period of 9 months. Ethical committee clearance was obtained from the institution. This study was conducted in a total population of 120 subjects. Out of 120, 40 were healthy controls and 80 were alcoholic liver disease patients divided into two groups, alcoholic hepatitis in group I and alcoholic cirrhosis in group II based on the liver ultrasound. Patients with non-alcoholic liver disease, coronary artery disease, patients on enzyme inducing medications like anticonvulsants are excluded from the study.

After obtaining informed consent in local language, random venous blood sample of 5ml was collected, the sample centrifuged at 2500 rpm for 10 minutes after clot retraction, serum separated and analysed for Serum gamma glutamyl transferase by IFCC Kinetic Method in AU480 Beckman coulter autoanalyser.

### Statistical analysis

All the data were entered in excel sheet. Statistical analysis is done using graph pad prism 6 software. Descriptive statistics of serum GGT were derived as Mean and standard deviation. Independent Student 't' test was employed to find out 'p' value between controls and group I, controls and group II, group I and group II.

### RESULTS

Descriptive statistics is given in Table: 1. The mean and standard deviation of serum GGT in various groups are controls  $17.88 \pm 0.84$ , cases group I  $231.50 \pm 38.63$ , cases group II  $91.73 \pm 15.76$ . Table: 2. Shows the comparison of serum GGT among controls and cases. Control and Group I shows a p-value of  $< 0.0001$  with 136.6 to 290.5 confidence interval, Control and Group II shows a p-value of  $< 0.0001$  with 42.43 to 105.3 confidence interval, Group I and Group II shows a p-value of 0.0013 with -222.8 to -56.66 confidence interval and are statistically significant.

**Table-1: Mean and Standard Deviation of Serum GGT in Controls and Cases**

Variables	Control	Cases group I	Cases group II
	mean $\pm$ S.D	Mean $\pm$ S.D	Mean $\pm$ S.D
Serum GGT ( U/L)	17.88 $\pm$ 0.84	231.50 $\pm$ 38.63	91.73 $\pm$ 15.76

**Table-2: Comparison Serum GGT in Controls and Cases – Student 't' test**

S.No	Serum GGT ( U/L)	p-value	95% Confidence Interval
1	Control Vs Group I	$< 0.0001$	136.6 to 290.5
2	Control Vs Group II	$< 0.0001$	42.43 to 105.3
3	Group I Vs Group II	0.0013	-222.8 to -56.66

P<0.05=significant

### DISCUSSIONS

Alcoholism is a major health problem in India and a high mortality rate is seen among Alcoholic liver disease patients. Serum GGT is the most sensitive and widely used as the marker of chronic alcohol consumption. In this study there is an elevation of serum GGT value in alcoholic hepatitis patients ( $231.50 \pm 38.63$ ) in comparison with ( $17.88 \pm 0.84$ ) with a p-value of  $< 0.0001$  this is in consistent with the study done by Dr.J.b gogoi *et al.* [5]. When the increase in GGT is five or more times greater than the increase in ALP, this point to a diagnosis of alcoholic hepatitis[6] in this study there is 3-4 fold raise among the alcoholic patients ( $231.50 \pm 38.63$ ). As high levels of serum GGT are seen in severe alcoholic liver disease patients though they may fall in the later stages of cirrhosis [4]. In this study there is a high level of serum GGT seen among alcoholic hepatitis patients compared to the alcoholic cirrhosis patients, and it show a fall in the serum GGT level in the later stage of cirrhosis. Matsuda *et al* in 1993 classified GGT responses to alcoholic drinking into 3 groups: non response, mild response and hyper response. In alcoholic liver disease non responders were scarcely found and the response of GGT tended to increase in parallel with progression of alcoholic liver disease [7] still some find that assay of GGT in serum is a misleading test and measurement of hepatic mitochondrial AST as a new marker enzyme in chronic alcoholism. From this study we found out serum GGT can be used as a marker for alcoholic liver disease. It is a more reliable marker in the severe disease during alcoholic hepatitis stage. Differences in study design, ethnic and racial differences across study

populations may account for the inconsistency of various other similar studies.

### CONCLUSION

We conclude from our study that serum GGT level is elevated in cases. Among the case in alcoholic hepatitis patient there is 3-4 fold raise in GGT level, but its level decrease to 1-2 fold raise among the alcoholic cirrhosis. Serum GGT can be used as the marker for alcoholic hepatitis.

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