

A Comparative Analysis of Serum Enzyme Levels in Liver Cirrhosis and Alcoholic Liver Disease

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ABSTRACT

Patients with chronic liver diseases are asymptomatic or have only vague non-specific symptoms. Effective medical treatments for chronic liver disease (before cirrhosis is established) are becoming increasingly available and since abnormal LFTs may be the only indication of this diseases. The study embarked on the comparative study of serum Enzyme levels in various liver diseases. serum Alkaline phosphatase (ALP), Gamma Glutamyl transferase (Gamma GT), Alanine and Aspartate amino transferases were estimated in viral Hepatitis, Alcoholic liver diseases, Obstructive jaundice, cirrhosis of the liver. It was observed that obstructive jaundice shows higher levels of ALP levels followed by alcoholic liver disease, viral hepatitis, cirrhosis of liver. Viral hepatitis shows higher rise of SGOT, SGPT levels, followed by alcoholic liver disease, obstructive jaundice, and cirrhosis of liver. Gamma Glutamyl transferase enzymes highest levels are seen in alcoholic liver disease. Conclusion: These enzymatic variations are useful to diagnose the disease and classify them according to etiology.

Keywords: Alanine and Aspartate amino transferases, Alcoholic liver diseases, Alkaline phosphatase, cirrhosis, Glutamyl transferase

How to Cite: Boobaham, A., Dahser, M. and Ueslubo, G. (2022) A Comparative Analysis of Serum Enzyme Levels in Liver Cirrhosis and Alcoholic Liver Disease. J. Biochem Mol. Biol. 1(1), 38-41. <https://doi.org/10.36108/jbmb/2202.10.0150>

INTRODUCTION

Liver disease is a general term for any damage that reduces the functioning of the liver. As a large organ the liver shares with many other abilities to perform its functions with extensive reserve capacity. Elevated levels of Gamma glutamyl transferase (GGT) are observed in chronic alcoholism, pancreatic disease, myocardial infarction, renal failure, chronic obstructive pulmonary disease, and in diabetes mellitus. In liver diseases GGT elevation parallels that of serum alkaline phosphatase (ALP) and is very sensitive of biliary track disease. The GGT level in alcoholic liver disease roughly parallels the alcoholic intake¹. GGT is a key enzyme for the detection of alcoholic liver disease. Very high levels of ALP are noticed in patients with obstructive jaundice, it is also elevated in serum in disease of bone, kidney, leucocytes, placenta and intestine. ALP is elevated in obstructive jaundice due to cancer, common duct stone, cholangitis, or bile duct structure (1). ALP is a key enzyme for the diagnosis of obstructive jaundice. ALP Transaminases increases in liver disease and also serum glutamate oxaloacetate transaminase (AST) level are significantly elevated in myocardial infarction. However, a marked increase in AST may be seen in primary hepatoma¹. Increased serum glutamate pyruvate transaminase (ALT) levels are seen in chronic liver disease such as cirrhosis of liver, hepatitis, and non-alcoholic SEATO hepatitis (NASH) (2).

Thus, it has been reported that all the four enzymes namely GGT, ALP, SGOT, SGPT, are useful parameters for diagnosis of various liver diseases. However, in a recent review some of these enzymes were not listed for their use in the diagnosis of various liver types of liver disease. Under these circumstances the aim of the present investigation was to study these enzymes in various types of liver diseases to assess their diagnostic importance (3).

MATERIALS AND METHODS

The present study was done over a period of six months from Jan to June of 2013, in Fathima Institute of Medical Sciences, Kadapa. After the institutional Ethical Committee approval and inform consent obtained from the patient, total 100 various liver disease patient admitted in the general medicine department of Fatima Institute of Medical science were included in the present study. All are age group between 30 to 55 years of both sexes.

Grouping of the patients:

Group1: Control healthy volunteers (N=50). Group2: Diagnosed as cirrhosis (N=25), Group3: Diagnosed as alcoholic liver disease (N=25).

The data on personal history, regarding the onset of the disease, alcohol consumption and treatment history of liver disease were collected through standard questionnaire. 10 ml of venous blood samples were collected in plain tubes, the serum was separated by centrifugation and the obtained serum was used for the estimation of SGOT, SGPT, ALP & Gamma GT4.

(1) Serum SGPT was estimated by International Federation of clinical chemistry (IFCC) method kinetic, SGPT is present in high concentration in the liver and to a lesser extent in kidney, heart, skeletal muscle, pancreas, and lung. Increased levels are generally a result of primary liver disease such as cirrhosis, carcinoma, viral or toxic hepatitis, Decreased levels may be observed in renal dialysis patients and with vitamin B6 deficiency.

(2) SGOT was estimated by IFCC method, Kinetic without Pyridoxal Phosphate, SGOT occurs in all human tissues and is present in large amount in liver, renal, cardiac, and skeletal muscle tissue. Increased levels are associated with liver disease or damage myocardial infarction, muscular dystrophy and cholecystitis. Decreased levels are observed in undergoing renal dialysis and those with B6 deficiency. values are expressed in IU/L.

(3). SERU ALP is found in practically all tissues of the body but in higher concentrations in the osteoblasts of bone, liver placenta, kidney, and lactating mammary glands. Increase ALP is seen in osteomalacia and rickets, low levels of ALP may be observed in conditions which causes arrested bone growth or in hypophosphatasia. SERUM ALP was estimated by P-Nitro phenyl phosphate method

(4) SERUM GGT elevation parallels that of ALP and is sensitive of biliary track disease. GGT is key enzyme for diagnosis of alcoholic liver disease. SERUM GAMMA GT was estimated by kinetic method.

RESULTS AND DISCUSSION

The bio-chemical findings of this study are expressed in the form of the following results the results were expressed as mean and SD, the normal values are used to compare value, for all parameters of the study the mean and SD were calculated for patients and controls. The p- value <0.001 is comparatively highly significant.

Table 1: Serum Enzymes In Various Liver Disease

PARAMETER	CIRRHOSIS OF LIVER	ALCOHOLIC LIVER DISEASE
SGOT(IU/L)	99.4±8.6	265.2±17.4
SGPT (IU/L)	89.5±9.9	182.0±12.3
ALP (IU/L)	167.2±12.3	364.5±21.45
GGT(IU/L)	93.3± 9.8	680.2±32.9

Data presented as Mean ± SD.

In this study higher levels of ALP and GGT were observed in serum in all cases of Alcoholic liver disease. However, the latter showed an average increase of about 6 times their mean normal values which was much higher than that of GGT in all cases of Alcoholic liver disease. It is well known that serum GGT and ALP are elevated in all cases of alcoholic liver disease, it shows that the importance of these enzymes are key enzymes of alcoholic liver disease. Further these enzymes are elevated in other liver diseases like obstructive jaundice; etc through this increase above normal values was marginal to that observed in alcoholic liver disease. Comparing the significance of GGT and ALP in alcoholic liver disease, the former seemed to be a better parameter for diagnosis. SGPT and SGOT levels in serum increased to 6 times the normal value in viral hepatitis whereas the levels of ALP increased only 3 times the normal value. The much higher increase of SGPT compared to SGOT suggests the former to be a better index of viral hepatitis. Mild elevation in serum levels of both enzymes was observed in most of the other cases of liver disease through significant increase was only seen in viral hepatitis. ALP levels in serum increased to 6 times the normal value in obstructive jaundice, it is a key enzyme for the diagnosis of the obstructive jaundice.

Estimation of these parameters is a guide for assessment of severity of the damage to the liver and

also a measure of good prognostic value. Irrespective of the etiology of liver, estimation of these parameters substantially provides a complete picture of liver disease.

CONCLUSION

In conclusion it shows that levels of GGT (Kinetic Method) are more use full than ALP, for diagnosis of alcoholic liver disease. Whereas SGPT (IFCC Method, Kinetic) is definitely a better index of viral hepatitis, than SGOT (IFCC Method, Kinetic without pyridoxal phosphate). ALP (P-Nitropheny phosphate) is a specific diagnostic parameter to indicate obstructive jaundice. The present work supports their inclusion and use as reliable tests for diagnosis of specific liver disease.

As the study is done the rural community, around Kadapa most of the patients are found to be with jaundice at later stages. The season was thought to be because of illiteracy, superstition and unawareness of the severity of the disease.

For this reason it is very important to bring awareness among the rural society about the importance of alcohol abuse, drug abuse, malnutrition, hepatitis and vaccination to children.

Author's Contribution:

BOOBAHAM, A., DAHSER, M., and UESLUBO, G.: Carried out the experimental work, wrote the manuscript

ACKNOWLEDGEMENT: Many thanks to the staff of BiochemistryLab.

FUNDING: The Authors did not receive any external support financially in carrying out this study

CONFLICT OF INTEREST: The Authors carry out this research with no conflict at stake towards anyone or any organization

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