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Research article

A STUDY ON SERUM ENZYME LEVELS IN VARIOUS LIVER DISEASES

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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 these diseases. **Aims:** Enzymes study of various liver diseases. **Discussion:** 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 the liver. Viral hepatitis shows higher rise of SGOT, SGPT levels, followed by alcoholic liver disease, obstructive jaundice, and cirrhosis of the 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: Gamma Glutamyl transferase, cirrhosis of liver, alcoholic liver disease.

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 intake[1]. 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, leukocytes, 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 hepatoma[1]. Increased serum glutamate pyruvate transaminase (ALT) levels are seen in chronic liver disease such as cirrhosis of the 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 asses their diagnostic importance[3].

MATERIALS AND METHODS

After the institutional Ethical Committee approval and inform consent obtained from the each patient, total 80 various liver disease patient admitted in the general medicine department of Fatima Hospital over a period of six months from June to December of 2012, were included in the present study. All are age group between 35 to 50 years of both sexes.

Grouping of the patients: Group1: Control healthy volunteers (N=20). Group2: Diagnosed as cirrhosis (N=20), Group3: Diagnosed as alcoholic liver disease=20), Group 4: Obstructive jaundice. Grope 5: viral hepatitis.

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 GT[4].

Serum SGPT was estimated by the 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.

Principle: L-alanine+2-oxoglutarate---ALT Pyruvate+L-Glutamate,pyruvate+NADH---LDH L-Lactate+NAD (ALT=Alanine aminotransferage, LDH=Lactate dehydrogenase) values expressed in IU/L, Normal values; Females:0-31IU/L, in males:0-40IU/L, at 37^0C,[5-7].SERUM SGOT was estimated by IFCC Method, Kinetic without Pyridoxial 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, muscula dystrophy and cholecystitis. Decreased levels are observed in undrgoing renal dialysis and those with B6 deficieny. values are expressed in IU/L.Priciple:L-spartate+2xoglutarate SGOT oxaloacetate +L-Glutamate, oxaloacetate+ NADH MDHMalate +NAD+ sample pyruvate +NADH L-Lactate+NAD,(AST=Aspartate aminotransferage, LDH=Lactate dehydrogenase, MDH=Malate dehydroginase) Normal values; Women: upto 31IU/L,Men:upto37IU/L[8-10]. 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 hepophosphatasia. SERUM ALP was estimated by P-Nitro phenyl

phosphate method Principle : AMP+4-NPP+H2O----ALP 4-nitrophenol+phosphate, and values expressed in IU/L Normal values; Females:50-170 IU/L. Male:50-96IU/L[10-14]. SERUM GGT elevation parallels that of ALP and is sensitive of biliary track disease. GGT is the key enzyme for diagnosis of alcoholic liver disease. SERUM GAMMA GT was estimated by kinetic method, principle: Glupa-C+Glycyglcine L-Gamma -Glutamyl-Glycyglycine+5-Amino-2-nitrobenzoicacid, GLUPA-C:L-Gamma-glutamyl-3-carboxy-p-nitroanilide, and values expressed in U/L, Normal values;Females:5-32U/L,Males:10-45u/L.

RESULTS

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 values, 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	VIRAL HEPATITIS	OBSTRUCTIVE JAUNDICE
SGOT(IU/L)	95.0±9.7	239.2±15.4	290.0±17.05	91.9±9.5
SGPT (IU/L)	98.5±9.9	152.0±12.3	499.3±22.3	96.35±9.81
ALP (IU/L)	151.2±12.3	222.15±17.45	183.85±13.6	678.45±26.04
GGT(IU/L)	90.3± 9.2	480.0±21.9	70.5±6.8	180.6±12.5

*Date presented as Mean±SD.

DISCUSSION

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 the 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 8 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. Where as 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 in 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 these varieties 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 for children.

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