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 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, leukocytes, placenta and intestine. ALP is elevated in obstructive jaundice due to cancer,
common duct stone, cholangitis, or bile duct structure. 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. 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).

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.

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.


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.

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°C.(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 unrdgoing 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;
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+Glycygline 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 *

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CIRRHOSIS OF LIVER</th>
<th>ALCOHOLIC LIVER DISEASE</th>
<th>VIRAL HEPATITIS</th>
<th>OBSTRUCTIVE JAUNDICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGOT(IU/L)</td>
<td>95.0±9.7</td>
<td>239.2±15.4</td>
<td>290.0±17.05</td>
<td>91.9±9.5</td>
</tr>
<tr>
<td>SGPT (IU/L)</td>
<td>98.5±9.9</td>
<td>152.0±12.3</td>
<td>499.3±22.3</td>
<td>96.35±9.81</td>
</tr>
<tr>
<td>ALP (IU/L)</td>
<td>151.2±12.3</td>
<td>222.15±17.45</td>
<td>183.85±13.6</td>
<td>678.45±26.04</td>
</tr>
<tr>
<td>GGT(IU/L)</td>
<td>90.3±9.2</td>
<td>480.0±21.9</td>
<td>70.5±6.8</td>
<td>180.6±12.5</td>
</tr>
</tbody>
</table>

*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 useful 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-Nitrophenyl 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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