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Alcoholic Hepatitis Specific to Gamma glutamyl Transferase In Patients Admitted To Mgm Hospital, Warangal District, Andhra Pradesh

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Abstract:- Enzyme activity and serum levels of gamma glutamyltranferase (GGT) in 60 patients (male and female) aged 35- 47 years admitted with various liver disorders in Mahatma Gandhi Memorial General Hospital, Warangal during the years 2001 to 2002 was investigated in this study. The aim of the study was to investigate if γ-GGT levels increase more in alcoholic hepatitis compared to other serum enzymes such as SGOT, SGPT and alkaline phosphatase, thus offering a more economically diagnostic and prognostic tool to assess the liver function with treatment and abstinence from alcohol. The number of cases with liver disorders admitted in Hospital was 60. Of these, 36 were males (60%) and 24 were females (40%). 20 cases (seven females and thirteen males) were provisionally diagnosed as alcoholic hepatitis. Four females and ten males were chronic alcoholic abusers while the remaining in this group are occasional drinkers. 40 (66%)cases were diagnosed to have other liver disorders like viral hepatitis(acute and chronic), obstructive jaundice and other hepatic ailments. The mean value of GGT in normal controls was 15.93 IU/ L. In alcoholic hepatitis the mean value for GGT was 80.26 IU/L. This shows a highly significant increase when compared to normal controls (p value < 0.001). In Acute viral hepatitis, the mean value was 24.4 IU/L, in chronic viral hepatitis the mean value was 28.1 IU/L.

Keywords: Gamma –GT, Hepatocellular disorders, Diagnostic, prognostic tools

I. INTRODUCTION

Alcohol abuse is a major public health problem in developing and developed countries. Excess alcohol intake has a detrimental effect on several organs of the body, liver being one of the major affected organs. Alcoholic hepatitis is distinct clinical syndrome among people with chronic and acute alcohol abuse. Alcoholic hepatitis is a syndrome of progressive inflammatory liver injury associated with long term alcohol intake[1].(Aswani k singal, et al) Chronic alcoholism is a frequent cause of liver disease. In acute alcoholic hepatits, when illness is mild the prognosis is still good, it is important to stress abstinence from any further alcohol consumption. Recommendations to the patients regarding good nutrition by supplementing vitamins especially folate and thiamine is vital (Sandeep Mukhergee et al.)

The various liver enzymes that are commonly measured through a venous blood draw for differential diagnosis of various liver diseases include Gamma glutamyltranferase (GGT), SGOT, SGPT and alkaline phosphatase.

Gamma- glutamyltransferase (GGT) is a glycoprotein found in endothelial cell membrane of the different organs[2]. The important function of GGT is to initiate peptide transport along with glutathione metabolism[2].Blood test results for GGT suggest that the normal value for men is 15-85 IU/L, whereas for women it is 5-55 IU/L[3]. Elevated serum GGT level remains the most widely used marker of alcohol abuse. Levels typically rise after heavy alcohol intake that has continued for several weeks[4] (Allen et al 1994). With 2–6 weeks of abstinence, levels generally decrease to within the normal reference range, with the half–life of GGT being 14–26 days[4]. Laboratory tests for evaluating GGT are inexpensive and readily available.

There are also large numbers of false negatives for GGT , Brenner et al (1997) observed that only 22.5 percent of construction workers drinking an average of 50-90 grams /day had elevated GGT values, and even among those consuming > 100 g/d, only 36.5 percent revealed high GGT levels[5].

With the afore said inconsistencies in the available literature, we investigated if GGT levels increase more in alcoholic hepatitis than other serum enzymes like AST (Aspartate Transaminase) or SGOT and ALT (Alanine Transaminase) or SGPT.

II. AIMS AND OBJECTIVES

1. To study the levels of AST, ALT, GGT in subjects with alcoholic and nonalcoholic liver diseases.
2. To compare the levels of these enzymes in alcoholic liver disease and to see which enzyme activity is more increased in alcoholic hepatitis.

III. MATERIALS AND METHODS

Type of Study: An observational study design.

Place of Study: Mahatma Gandhi Memorial General Hospital, Warangal, Andhra Pradesh

Study duration:

Selection of Subjects: Patients visiting General Medicine OPD of Mahatma Gandhi Memorial General Hospital. The study subjects are divided into two groups as mentioned here under.

Cases: 60 patients (36 males and 24 females) who were admitted in Mahatma Gandhi Memorial General Hospital, Warangal in male and female medical wards with liver disorders during the years 2001 to 2002. Age group of patients ranged from 35 years to 47 years. All the patients were conscious and co-operative at the time of admission.

Controls: 60 normal persons(30 males and 30 females) were selected as controls. These persons were free from any liver disorders. The age group selected was similar and comparable to cases i.e. men and women between thirty five years to forty seven years.

Collection of blood specimen and handling: [6,7]

NCCLS Guidelines were followed for sample collection, handling and processing.

Specimen Collection:

5 ml of random venous samples were collected from all the subjects. The sample was collected immediately after admission before any treatment was given to the patients. The subjects were allowed to seat comfortably for 15 min with left arm extended in a straight line from shoulder to wrist. Median cubital vein in the cubital fossa was selected for venipuncture. .

Specimen Handling & Processing:

At the end of sample collection, the venous blood sample was immediately transferred into plain vacutainers and serum was separated by centrifugation of the sample at > 3000 rpm for 5 min.The serum was stored at -80°C in the laboratory till analyses.

The following parameters were estimated on Dade Behring biochemistry analyzer.

Gamma Glutamyltransferase (GGT): Assayed on Dade Behring Clinical Chemistry System (autoanalyzer) that employs the IFCC UV kinetic principle. The γ-glutamyltransferase method is an adaptation of the methodology recommended by the International Federation of Clinical Chemistry (IFCC). The method uses the substrate L-gamma-glutamyl-3-carboxy-4-nitroanilide with glycylglycine.

Aspartate Transaminase: Assayed on Dade Behring Clinical Chemistry System (autoanalyzer) that employs the UV kinetic principle.

Alanine Transaminase: Assayed on Dade Behring Clinical Chemistry System (autoanalyzer) that employs the UV kinetic principle.

Quality Control: Quality check was done for the above parameters. The results were evaluated by comparison with standards of known concentration. Measures were taken for checking the kit to kit variability and the repeatability was checked by duplicate testing. The intra and inter assay coefficients of variation for all the parameters were maintained <5%.

Data Analyses: The data was collected, processed in MS-Excel and checked for the distribution. The data was more or less normally distributed and any skewness if at all was very minimal. Hence the means of variables in the study groups were compared with that of controls using unpaired student t- test. Statistical analysis was done on online graph pad statistical calculator. A P- value <0.05 was considered statistically significant.

Results:

When tissue damage occurs cellular enzymes may be released in to the serum and the elevation of certain enzymes is often associated with damage to the specific tissues or organs. GGT,ALT, AST and ALP are the components of liver function panels. These enzymes are present in tissues throughout the body. Their elevation in combination is most often associated with liver injury or pathology. Elevation of serum aminotransferases level AST or SGOT and ALT or SGPT often reflect hepatocellular damage. The AST:ALT ratio (with elevated levels of both enzymes) is approximately 1:1 for the primary liver disease. A high AST:ALT ratio of 2:1 or 3:1 occurs in patients with chronic alcohol induced liver damage. GTT is very sensitive to ingestion of alcohol . Even small amounts of alcohol ingested 24 hours prior to the test may cause a temporary elevated GGT. GGT also very sensitive in the detection of bile duct problems and increases nearly 12 times the upper reference limit in patients with cholestasis. GGT is more sensitive than ALP , which increases an average of 3 times the upper reference limit in alcohol abuse. Suggested uses of GGT include confirmation of the hepatic origin of elevated ALP levels and support of the diagnosis of alcohol abuse in patients with elevated ALT and AST (2:1). With other enzyme abnormalities, a raised GGT would support a hepatobillary source .It would confirm hepatic source for a raised ALP. A raised GGT with transaminases and a ratio of AST to ALT of 2:1 or more would support alcohol related disease. Isolated or disproportionate elevation compared to other liver

enzymes like ALP or ALT may indicate alcohol abuse or alcoholic liver disease.(Kaplan MM,et al 1985) "

Biochemical basis for serum enzyme abnormalities in alcoholic liver diseases" According to Gjerde et al 1988, GGT levels increases in continuous alcohol addicts, even in episodic and few moderate drinkers. Several studies by Bargrel et al 1979: Chick et al; 1981; Papoz et al;1981, Persson et al 1990, Leino et al; 1995,Anttila et al 2004 reported a positive correlation between amount of alcohol consumption and serum GGT levels.

Other causes which could elevate GGT levels like certain hepatobiliary disorders, diabetes and hyperglyceridemia(Meregalli et al 1995) (Sillanaukee 1996). There are also large numbers of false negatives for GGT , Brenner et al (1997) observed that only 22.5 percent of construction workers drinking an average of 50-90 grams /day had elevated GGT values, and even among those consuming > 100 g/d, only 36.5 percent revealed high GGT levels.

Biochemical Parameters in Normal individuals.

S.No	ϒ- GT	AST	ALT	ALP
	U/L	I.U/L	I.U/L	K.A.U/dl
1	20	20	10	9.5
2	15	35	18	10.6
3	10	28	9	6.0
4	12	17	16	4.5
5	12	23	10	9.0
6	14	28	18	10
7	12	14	9	5.0
8	13	18	10	6.7
9	10	18	25	5.5
10	28	30	14	20
11	20	30	14	4.0
12	20	10	22	7.0
13	25	12	10	10
14	13	24	12	9.5
15	15	28	19	4.0
MEAN	15.93	22.6	14.8	7.55
S.D	7.16	5.31	0.4	8.14
SE	1.85	1.37	0.1	2.1

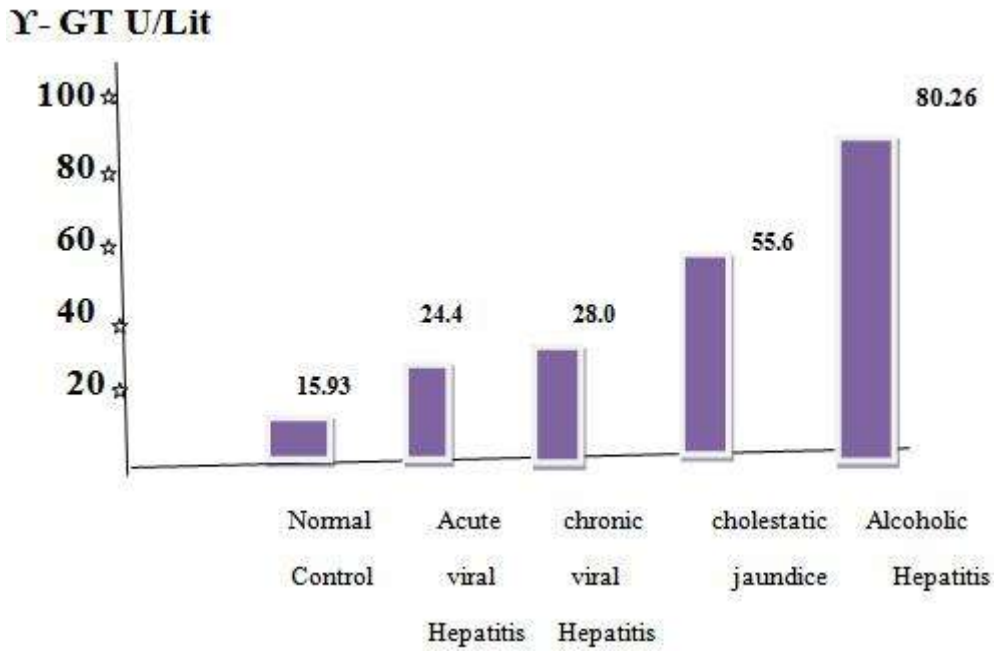
Table 2. Comparison of Biochemical parameters of normal individuals with Alcoholic Hepatitis.

Group	Statistics	ϒ- GT	AST	ALT	ALP
Control	Mean SD	15.93 7.16	22.6 5. 31	14.8 0.4	7.55 8.14
Alcoholicc Hepatitis	Mean SD	80. 26 15.62	40.06 15.93	29.4 0.96	17.86 18.82
	%Change Decrease Or increase	403.82	121.5	98.65	136.42
	P-Value Significance	<0.001 H.S	> 0.01 M.S	>0.01 M. S	<0.001 H.S
Note:	HS= High significance	MS= Moderately Significance	NS= No Significance		

Table 3: Comparison of Biochemical parameters of chronic viral hepatitis with chronic alcoholic hepatitis.

Group	Statistics	ϒ- GT	AST	ALT	ALP
Chronic Viral Hepatitis	Mean SD	28 20.03	50 17.17	31.8 0.83	11.54 21.82
Chronic Alcoholic Hepatitis	Mean SD	80.26 15.62	40.06 15.93	29.4 0.96	17.86 18.82
	%change Increase/ Decrease	186.6	- 19.8	-8.16	- 22.17
	p-value	<0.001	>0.1	>0.1	>0.1
	Significance	H.S	N.S	N.S	N.S
Note-HS=High significant, MS= Moderately significant, NS= Normal significant.					

Figure 1
Comparison of mean ϒ – GT levels between normal controls with patients.



Results: The mean value of ϒ – GT in normal controls was 15.93 IU/ Lit. In Alcoholic Hepatitis mean value for ϒ –GT was 80.26 IU.Lit. This shows a highly significant increase when compared to normal controls. (p value < 0.001). In Acute viral hepatitis the mean value was 24.4 IU/Lit, In chronic viral hepatitis the mean value was 28.1 IU/Lit. Hence ϒ- GT levels are not significantly altered in acute and chronic viral hepatitis. In Cholestatic jaundice mean value for ϒ –GT was 55.6 IU/Lit. The increase in highly significant (p value < 0.001).

Similar findings were reported by pols, poyherrd T, Bedossa p, et al[1] and also by Shimanaka.K, Tsutsumi M et al[32] .

IV. DISCUSSION

Liver problems include a wide range of diseases and conditions that can affect your liver. Liver is a organ sits just under rib cage on the right side of your abdomen. Without your liver, you could not digest food and absorb nutrients, get rid of toxic substances from your body or stay alive.

Liver problems can be inherited, or liver problems can occur in response to viruses and chemicals. Some liver problems are temporary and go away on their own, while other liver problems can last for a long time and lead to serious complications. Liver helps in fight infections and clean blood. It also helps in digest food and stores energy for when you need it. A healthy liver has the amazing ability to grow back, or regenerate,

when it is damaged. Anything that keeps your liver from doing its job – or from growing back after injury-may put our life in danger.Alcohol level >300mg /100ml is extreme intoxication leads to drowsiness and then coma.Level > 400mg /100ml may be fatal. Excessive alcohol consumption may leads to raised MCV, platelet count may be decreased or elevated serum enzymes .Gamma-GT is the best indicator of excessive alcohol consumption.Alcoholism may be associated with dyslipideamia, notably hypertriglyceridia.Alcoholic disease occurs after years of drinking and 20 to 25 percent get serious liver disease. The initial stage is fatty liver which then progreses to alcoholic hepatitis or cirrhosis. Cirrhosis on long term can lead to liver cancer

V. SUMMARY AND CONCLUSION

Aim of this work was to study the pattern of Biochemical changes in hepatic disorders specifically Alcoholic Hepatitis and Gamma- GT levels.

Study changes in various Biochemical parameters are very useful in differential diagnosis of hepatic disorders. ϒ – GT levels were normal in Acute and Chronic hepatitis but moderately increased in cholestatic jaundice and highly increased in Alcoholic hepatitis. Elivated ALP levels in Alcoholic hepatitis suggests there is some damage to canalicular cells in Alcoholic hepatitis.

Highly elevated serum transaminase levels are observed in this study. In case of Acute hepatic disorders like Acute viral hepatitis ,increased transaminases levels are directly related to the amount of hepatocellular damage. Higher levels indicate severe disease. Moderatly elevated transaminases levels are observed in chronic viral hepatitis which shows that as disease progresses from acute to chronic phase there is fall in transaminase levels.

Subjects taken as normal and patients were comparable age, weight and sex.

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