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A STUDY OF GGT IN ALCOHOLICS WITH AND WITHOUT LIVER DISEASE

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ABSTRACT

Introduction-
Alcohol abuse and alcohol-induced liver disease represent major mortality risks. Gamma-glutamyltransferase (GGT) is a highly sensitive indicator of heavy drinking and fatty liver, the most common pathological condition associated with alcohol abuse. Although challenged by some as too sensitive and too non-specific for diagnostic purposes, it has been endorsed for use in alcoholic treatment programs. In combination with SGOT, SGPT, alkaline phosphatase and HDL, its value is considerably enhanced.

Objectives-
The aim of the present study is to assess the level of GGT and Biochemical liver function tests in alcoholics as biological markers and to find out the usefulness of these tests in alcoholics with and without liver abnormality as determined by ultrasonographic changes.

Methods-
60 male patients aged 15-45 years attending the psychiatry out patient department who fulfilled DSM 5 criteria for alcohol dependence were selected.
Blood sample was analysed for determining Hb%, Total WBC Count, Differential WBC Count, and Liver Function Tests (S.Bilirubin, S.Proteins, AST, ALT, GGT, Alkaline Phosphatase, GGT). the patients were further screened for liver abnormalities by ultrasonography of abdomen.

Results-
The current study showed a significant increase in levels of GGT in 78.4% and S. Bilirubin (67.6%), AST (66.1%), ALT (47.6%) and ALP (46%) patients. In cases of Group I (with liver abnormality) values of GGT, AST, and ALT were statistically higher than cases of Group II (without liver abnormality). Though literature supports that serum GGT determination was far more sensitive indicator of hepatic involvement than the transaminases or alkaline phosphatase, in the present study AST and ALT were also sensitive enough.

KEYWORDS : gamma glutamyl, transferase, alcohol.

INTRODUCTION

Alcohol abuse and alcohol dependence is a problem in both developed and developing countries1. 30% of all adults in the community are known to abuse alcohol and 4% become alcohol dependent2. Up to one third of all psychiatric patients are likely to have an alcohol problem that either cause or exacerbate the clinical condition3.

Though alcoholism is a self limiting disease, it's toxic properties lead to pathological changes in various organs causing high mortality rates. Only phases of drinking a larger or intoxicating amount or regular drinking with consumption of ethanol above 60 grams a day lead to a state that meet the criteria for a psychiatric disorder3.

Alcohol effects almost all organs of the body and causes some reversible and non-reversible changes in the body. It is primarily metabolized in the liver4. It is vulnerable to an oxidative stress induced injury due to the generation of reactive oxygen metabolites during the course of the alcohol metabolism and because of this, Alcoholic Liver Disease (ALD) has become a major cause of morbidity and mortality in India5,6.

The quantity and the type of alcohol which is ingested is the most important risk factor for the development of ALD. An alcohol mediated increased production of pro-oxidants, as well as a decrease in the antioxidant defense systems (enzymatic and non-enzymatic) in the liver may contribute to the development of ALD. An imbalance between the pro-oxidants and the antioxidants leads to oxidative stress which is characterised by escalating the cell damage7.

Diagnosis of alcoholism is made by history taking, clinical examination and by biochemical investigations. Establishing a diagnosis of alcohol abuse or dependanceis usually based on the history given by the patient or a resource person who is acquainted with the patient's life problem.

Even when attendants or family members bring alcoholics to hospital, they understate their level of alcohol consumption. Therefore apart from taking history, there is a need to diagnose the quantity of alcohol intake by reliable biochemical parameters.

Blood levels of the liver enzyme Gamma GlutamylTransferase (GGT) are used as a biomarker for heavy drinking8. GGT is implicated in alcohol use by keeping intracellular glutathione, the body's most abundant anti-oxidant, at adequate levels to protect cells from oxidative stress resulting during metabolism (e.g. that of alcohol)9.

GGT is an enzyme that is required in the transport of amino acids and it is found in most parts of the body. It is increased due to hepatic induction at the site of endoplasmic reticulum and it catalyses the formation of 5-amino nitrobenzene.

Raised GGT is found after consumption of about 60 grams of absolute alcohol for more than 21 days. It returns to normal level after 14 to 60 days of abstinence from alcohol. 20% increase in enzyme level after 2-4 weeks of abstinence can be useful in identifying patients who have returned to drinking after treatment. Some other conditions in which GGT is increased are; treatment with anticonvulsants, anti diabetics and other liver diseases10.

Rosalki and co-workers studied 50 chronic alcoholic patients and found that serum GGT determination was far more sensitive indicator of hepatic involvement than the transaminases or alkaline phosphatase. They observed increase GGT levels in 74% of their patients as compared to raised AST in 30% and raised ALT in 20% of patients11.

Mohammed Zein demonstrated that in alcoholics, serum GGT levels considerably increased in chronic alcoholism even when transaminases were perfectly normal12.

The aim of the study is to assess the level of GGT and Biochemical liver function tests in alcoholics as biomarkers and to find out the usefulness of these markers in alcoholics with and without liver abnormality.

MATERIALS AND METHODS-

Materials for the current study were collected from patients diagnosed as Alcohol Dependent according to the DSM-5 criteria, utilizing the psychiatric services at the Department of Psychiatry, Asram Medical College, Eluru from July to October 2018.

The study included male patients aged 15-45 years who fulfilled DSM 5 criteria for alcohol dependence and had not undergone detoxification for the present episode. There were no controls since the study was a comparative study.

Patients on anti-epileptic, anti-diabetic or antibiotic medications, those with a recent attack of myocardial infarction, significant anaemia (Hb below 10 grams percent) and those who had liver diseases other than alcoholic liver disease were excluded.

The Institutional Ethics committee approved the study. Before their participation, the volunteers were fully informed of the nature and purpose of study and a written consent was obtained from each.

The selection of cases was done till there were 30 cases in each category i.e. those with liver dysfunction and those without liver dysfunction. Thus there were more than 60 cases in total. The diagnosis of Alcohol Dependence was made according to DSM-5 criteria. The liver dysfunction in the study was defined as abnormal liver function tests and /or abnormal liver ultrasonography. The patients selected underwent general and systemic examination and their socio-economic status was determined by Prasad's socio-economic scale. Their psychiatric history and mental status examination was recorded in a proforma. Blood sample was drawn after overnight fasting. Sample was analysed for determining Hb%, Total WBC Count, Differential WBC Count, and Liver Function Tests (S.Bilirubin, S.Proteins, AST, ALT, GGT, Alkaline Phosophatase, GGT).

ESTIMATION OF GAMMA GLUTAMYL TRANSFERASE (GGT) BY OPTIMIZED SZASZ METHOD-

Principle-

GGT in the serum sample liberates 5-amino-2-nitrobenzoate from the substrate L-gamma glutamyl-3 carboxy-4 nitroanilide. L-glycylglycine serves as then glutamyl acceptor. The rate of liberation of 5-amino-2nitrobenzoate, which is a chromogenic substance with a high absorbance at 405nm, is measured as ΔA/ minute in a spectrophotometer,

L-gamma-glutamyl-3-carboxy-4 nitroanilide + Glycylglycine

↓

L-gamma-glutamyl-glycylglycine + 5 amino-2-nitrobenzoate

Reagents-

Reagent 1- Tris Buffer pH 8.25 at 25°C	182mmol/L
Reagent 2- L-gamma-glutamyl-3-carboxy 4 nitroanilide	2.97mmol/L
Glycyl Glycine	85mmol/L
Tenside	3gm/L

Reagent 2 was reconstituted with 3ml of reagent 1 using micropipettes and mixed gently. This reagent is stable for 21 days at 2-8°C or 5 days at 15-25°C.

Assay Procedure-

0.1 ml of serum and 1.0 ml of reagent were taken in a test tube mixed and incubated for 1 minute and the changes in optical density (ΔA/min) per minute for 3 minutes was measured at 25°C against distilled water at 405nm. This method was programmed in auto analyser (Ciba Corning Express Plus 550) and results were recorded.

Calculation-

The ΔA/minute were determined for 3 minutes and the mean value was calculated and thenmultpilied with the factor 11.58.

GGT= ΔA/minute x 11.58= _____U/L.

RESULTS-

Results have been analysed under the following headings-

- Socio-Demographic Data.
- Characteristics of the case group.
- Personal characteristics of the case group.
- Biochemical correlates.

SOCIO-DEMOGRAPHIC DATA-

A total of 66 patients were included in this study. They were divided into two groups according to Ultrasonograhic findings. 36 patients had changes in the liver. They were labeled as Group-I. 30 patients who had normal liver architecture were considered as Group-II.

The mean age of the Group-I was 37± 5.8 years and of Group-II was 35± 5.9 years. There was no statistical significance between the groups.

All cases were males.
In Group-I , 20 (55.5%) were from rural area and 16 (44%) were from urban area. In Group-II, 19 (63.3%) were from rural area and 11(36.66%) were from urban area.

In Group-I, 35 (97.22%) were Hindus and 1(2.77%) was a Muslim. In Group-II 28 (93.3%) were Hindus and 2 (6.66%) were muslims. The differences were not statistically significant.

In Group-I, 17(47.22%) were agriculturists, 8(22.22%) were in Government service and 11(30.5%) others included businessmen and other private employment. In Group-II, 11 (36.6%) were agriculturists, 3(10%) were in Government services, 16 (53.3%) others included businessmen and others private employment.

In Group-I, 8 (22.2%), 8(22.2%), 7(19.4%), 9(25%), and 4(11.1%) of patients were from Socio Economic Class I, II, III, IV and V respectively. In Group-2 0(0%), 7(23.3%), 6(20%), 15(50%) and 2(6.6%) were in Socio Economic Class I, II, III, IV and V respectively.

TABLE-1 General Characteristics of the Sample

CHARACTERISITCS	GROUP-I (N=36)	GROUP-II (N=30)
Age in years (Mean and SD)	37± 5.8	35±5.9
Place		
Rural	20	19
Urban	16	11
Education		
Illiterate	2	5
Upto 10th Std	19	19
Above 10th Std	15	6
Occupation		
Agriculturist	17	11
Government	9	3
Others	10	16
Socio- Economic Status		
Class I	8	0
II	8	7
III	7	6
IV	9	15
V	4	2
Marital Status		
Married	35	27
Unmarried	1	3
Type of Family		
Nuclear	20	16
Joint	16	14

CHARACTERISTICS OF CASE GROUP:

TABLE- 2 Drinking characteristics of the sample

VARIABLES	GROUP I (N=36)	GROUP II (N=30)	STATISITCAL SIGNIFICANCE
Age of Starting	24±4.6	24±4.0	Not significant
Duration of Alcohol intake	13±5	11±6	Not significant

In Group I, the mean age of starting alcohol intake was 24±4.6 years and mean duration of alcohol intake was 13±5 years. In Group II the mean age of starting alcohol intake was 24±4 years and the mean duration of intake was 11±6 years. There was no statistical difference between the two groups.

Type of drink in Group I, 6 were drinking whisky, 5 brandy, 5 rum, 5 arrack only, others were taking a combination of these. In Group II, 4 were drinking whisky, 5 brandy, 1 rum, and 7 arrack only, others were taking a combination of these. There was no statistical significance.

Family History- In Group I, 12 (33.3%) had family history of alcoholism. In Group II, 7(23.3%) had family history of alcoholism. There was no statistical significance between both groups.

Withdrawal symptoms- Tremor was the most commonest withdrawal symptom occurring in 32 (88.8%) cases and 26(86.6%), followed by sleeplessness 28 (80.55%) and 24(80%) and restlessness 25(69.44%) and 21 (70%) in Group I and II respectively.

TABLE- 3 Personal Characteristics of the sample

PERSONAL CHARACTERISTICS	GROUP I (N=36)	GROUP II (N=30)
DIETARY HABITS Veg Non Veg	12 24	7 23
CO MORBID SUBSTANCE USE Tobacco Betel Leaf Others	35 10 1	17 11 —

Dietary Characteristics- In Group I, 25 (66.6%) patients were non-non-vegetarians and 12(33.3%) patients were vegetarians. In Group II, 23 (76.6%) patients were mon vegetarians and 7 (23.3%) patients were vegetarians. In both groups non-vegetarians were more in number. However there was no statistical significance between the groups regarding nature of diet.

Co-morbid substance use- In Group I, 35 patients used tobacco and 10 were chewing betel leaf. In Group II, 28 patients used tobacco and 11 chewed betel leaf. There was no statistical significance between the two groups.

Stress factors- In Group I, 13 (36.11%) patients had stress factors. In group II, 8 (26.6%) patients had stress factors. There was no statistical significance between the groups with reference to experience of stress factors.

BIOCHEMICAL VARIABLES-

In Group I, one patient had a very high GGT value of 1289. Therefore that case was eliminated for statistical purpose. Hence Group I had only 35 patients for statistical analysis with regard to biochemical variables.

TABLE- 4 Normal and Abnormal Biochemical Variables

	NORMAL VALUES	MEAN AND SD	ABNORMAL	NORMAL
S.BILIRUBIN	Upto 1mg	1.6±0.94	44 (67.6)	21 (32.4)
S. PROTEIN	6.0-8.3gm/dl	6.9±0.99	2 (3.07)	63 (96.9)
ALBUMIN	3.8-4.4gm/dl	4.0±0.6	13 (20.0)	52 (80)
GLOBULIN	2.5-3.8gm/dl	2.9±0.9	8 (12.3)	57 (87.7)
ALP	Upto 90µ/l	102.7±57.8	30 (46.1)	35 (53.9)
AST	Upto 46µ/l	86.5±74.8	43 (66.1)	22 (33.9)
ALT	Upto 50µ/l	61.4±45.2	31 (47.6)	24 (52.4)
GGT	Upto 50µ/l	136±119	51 (78.4)	14 (21.6)

The total sample size was 66. The mean and standard deviation of Serum Bilirubin was 1.6±0.94, 44 patients had abnormal values. Serum proteins 6.9±99 with 2 abnormal values, Serum Albumin 4.0±06 with 13 abnormal values, Serum Globulin 2.9±0.9 with 8 abnormal values, ALP 102.7±57.8 with 30 abnormal values, AST 86.5±74.8 with 43 abnormal values, ALT 61.4±45.2 with 31 abnormal values and GGT 136±119 with 51 abnormal values.

TABLE- 5 Number and Percentage of normal and abnormal variables in Group I and Group II

	Normal values	GROUP I (n=35)		GROUP II (n=30)	
		Normal (%)	Abnormal(%)	Normal (%)	Abnormal (%)
S. Bilirubin	Upto 1mg	10 (28.5)	25 (71.5)	11(36.6)	19 (63.4)
S. Proteins	6.0-8.3gm/dl	34(97.1)	1 (2.8)	29 (96.9)	1 (3.3)
S. Albumin	3.8-4.4 gm/dl	26(74.2)	9 (25.8)	26 (86.6)	4(13.4)
S. Globulin	2.5-3.8gm/dl	29 (82.8)	6 (17.2)	28 (93.3)	2 (6.6)
ALP	Upto 90u/l	16 (45.7)	19 (54.3)	19 (63.3)	11(36.6)
AST	Upto 46u/l	8 (22.8)	27(7.2)	14 (46.6)	16(53.4)
ALT	Upto 50u/l	11(31.4)	24 (68.6)	23 (76.6)	7 (23.3)
GGT	Upto 50u/l	3 (8.3)	32 (91.5)	11 (36.6)	19 (63.3)

In Group I, 25(71.5%) patients had abnormal S. Blirubin, 1(2.8%) had high S.protiens, 9 (25.8%) had high S. Albumin, 6 (17.2%) had high S. Globulins, 19 (54.3%) had high ALP, 27 (77.2%) had high AST, 24 (68.6%) had high ALT, and32(91.2%) had high GGT values.

TABLE - 6 Biochemical variables (mean values) between Group I and Group II

VARIABLES	GROUP I (N= 35)	GROUP II (N=30)	Z TEST	'P' VALUE
S. Bilirubin	1.9±1.1	1.3±0.6	2.67	<0.01 (Significant)
S. Proteins	7.0±1.06	6.8±0.9	0.81	NS
S. Albumin	4.0±0.66	4.0±0.6	0	NS
S. Globulin	3.1±1.07	2.8±0.7	1.31	NS
ALP	117.2±67.04	92.3±36.39	1.08	NS
AST	114.3±105.86	66.7±49.5	2.26	<0.05 (Significant)
ALT	74.8±45.8	47.2±40.3	2.56	<0.02 (Significant)
GGT	180.3±136.87	80.8±55.4	3.73	<0.01 (Significant)

When GGT and other liver function tests of Group I and Group II were compared, values of S. Bilirubin ($p < 0.01$), AST ($p < 0.05$), ALT ($p < 0.02$) and GGT ($p < 0.01$) were significantly high in Group II than in Group I. Differences in S. Proteins, S.Albumin, S. Globulin was not statistically significant.

TABLE- 7A and 7B Mean Biochemical values in patients with duration of Alcohol intake of less than and more than 10 years

Table -7A

VARIABLES		GROUP I	
	INTAKE LESS THAN 10 YEARS (N=13)	INTAKE MORE THAN 10 YEARS (N=22)	t TEST df33

S. Bilirubin	1.8±1.1	1.92±1.12	0.31
S. Proteins	6.6±1.0	7.17±1.07	1.51
S. Albumin	4.0±0.7	3.95±0.66	0.21
S. Globulin	2.7±0.6	3.27±1.1	1.72
ALP	107.5±64.5	112.8±69.3	0.65
AST	103.3±119	120±99.7	0.47
ALT	75.2±55.7	74.6±40.3	0.04
GGT	179.8±144.1	180.5±135.9	0.01

Table -7B

VARIABLES		GROUP II	
	INTAKE LESS THAN 10 YEARS(N=17)	INTAKE MORE THAN 10 YEARS (N=13)	T TEST df33
S. Bilirubin	1.4±0.7	1.2±0.4	0.92
S. Proteins	6.9±0.9	6.8±0.9	0.3
S. Albumin	4.1±0.7	3.9±0.4	0.92
S. Globulin	2.8±0.6	2.9±0.8	0.39
ALP	89.4±53.6	96.2±36.6	0.39
AST	67.24±54.8	64.5±43.7	0.15
ALT	46.2±37.2	48.5±44.9	0.15
GGT	71.1±48.3	92.7±1.07	1.07

When each group was subdivided into groups with history alcohol intake less than 10 years and more than 10 years, almost all the variables were raised in both groups with more than 10 years intake, but the increase was not statistically significant.

TABLE -8 t values of biochemical variables in patients with duration of less than and more than 10 years of alcohol intake in Group I and II

VARIABLES	INTAKE LESS THAN 10 YEARS G-I vs G-II t, df28	INTAKE MORE THAN 10 YEARS G-I vs G-II t, df33
S. Bilirubin	1.21 NS	2.22 p<0.05
S. Proteins	0.86 NS	1.05 NS
S. Albumin	0.39 NS	0.25 NS
S. Globulin	0.45 NS	1.06 NS
ALP	0.84 NS	1.28 NS
AST	1.11 NS	1.89 NS
ALT	1.71 NS	1.78 NS
GGT	2.92 p<0.01	2.19 p<0.05

When t values of biochemical variables were compared, Group I patients with less than 10 years of intake had high level of GGT than Group II patients with less than 10 years of intake ($p<0.01$). Whereas, Group I patients with more than 10 years of intake had high level of GGT than Group II patients with more than 10 years of intake ($p<0.05$). In addition, Group I patients with more than 10 years of alcohol intake had high level of serum bilirubin than group II patients with more than 10 years of intake ($p<0.05$).

TABLE -9 A Mean Biochemical values in patients aged below and above 30 years.

PARAMETERS	GROUP I		
	BELOW 30 YRS (N=6)	ABOVE 30 YRS (N=29)	t TEST df33
S. Bilirubin	2.0±0.8	1.8±1.1	0.42
S. Proteins	6.7±1.3	7.0±1.1	0.59
S. Albumin	4.2±0.54	4.0±0.7	0.66
S. Globulin	2.7±0.77	3.1±1.1	0.84
ALP	98.8±61.9	116.5±68.7	0.58
AST	113.7±92.6	109±92	0.11
ALT	53±18.5	74.9±47.6	1.1
GGT	144.2±59.9	196.9±141	0.89

Table 9B

PARAMETERS	GROUP II		
	BELOW 30 YEARS (N=7)	ABOVE 30 YEARS (N=23)	t TEST df28
S. Bilirubin	1.5±0.9	1.2±0.4	1.27
S. Proteins	7.3±0.9	6.7±0.8	1.69
S. Albumin	4.3±0.7	3.9±0.5	1.69
S. Globulin	3±0.3	2.8±0.7	0.73
ALP	119±68.03	84.2±35.8	1.8
AST	70.14±49.7	64.8±50.2	0.28
ALT	49.7±37	46.4±41.6	0.19
GGT	88.2±60.3	78.9±55.3	0.38

Therefore, if biochemical markers such as GGT and LFTs are combined with history of alcohol intake, it will be of immense value detecting cases of alcohol use, abuse and dependence at the earliest. In addition to the biological markers, it is worthwhile to do Ultrasonographic examination of liver for early detection of liver abnormality.

DISCUSSION

In routine practice, alcohol problems in medical patients go undetected and unattended because alcohol consumption is socially acceptable. Identifying progression of alcohol use to abuse and to dependence helps to prevent disability due to alcohol. Biological markers are useful not only to detect alcoholism but also to determine the damage it causes to target organs like liver.

The main aim was to study the GGT and LFTs as markers in alcoholics and to compare ultrasonographic abnormality of liver and biochemical parameters of liver function.

The present study showed raised levels of GGT in 78.4% The increased GGT level in 78.4% cases in the present study is similar to the finding in studies by Rosalki et al11 -74% cases, in Desai et al13-80.5% of cases, Weill et al14 -81% cases.

This study besides GGT showed increase in S. Bilirubin, AST, ALT and ALP. This in accordance with the study by Eckardt et al15,16.

This study showed increase in S. Bilirubin (67.6%), AST (66.1%), ALT (47.6%) and ALP (46%). A study by Rosalki et al11, showed increase of AST in 30% cases and increase of ALT in 20% cases. Three indian studies viz; Desai et al13, and Prathima Murthy has also reported similar findings. Study by Desai et al had found transaminase increase in majority of cases with raised AST in 96.7% and raised in 94.4%.

Zeinet al12, were of the opinion that GGT levels increase with alcoholism even when transaminases were perfectly normal.

Kristensson was of the view that GGT as screening helps in detecting hidden alcoholism. After screening symptom free middle aged men, he came to the conclusion that serum GGT when included in general medical screening examination may help in detecting hidden alcoholism17.

Many studies have found that increased GGT levels decrease after abstinence of alcohol. Weill et al, is of the opinion that GGT levels below the reference levels also decline with abstinence. Hence GGT estimation is useful even in cases where GGT level is in normal level in the initial examination. Ray et al, and Prathima Murthy18, found that GGT, AST and ALT levels declined after 30 days of abstinence.

Out of the total 66 cases, 36 patients had ultrasonographic liver abnormality the form of hepatomegaly and fatty liver (Group I). Remaining 30 cases were ultransonographically normal (Group II). USG was used to detect hepatic abnormality, as it is a non-invasive screening procedure and also because it is claimed that except for a minimal change USG detected many of the pathological changes seen in alcoholic liver disease.

Group I cases did not differ with one another regarding age, place, place of residence, religion, educational status, occupation, type of family, socioeconomic status, and marital status. Mean age of starting alcohol and mean duration of alcohol intake also did not have significant difference between groups. Family history of alcoholism, type of diet, co-morbid substance use and presence of stress factor too did not vary between the groups. Withdrawal symptoms and co-morbid substance abuse in both groups were similar.

In cases of Group I values of GGT, AST, and ALT were statistically higher than cases of Group II. Though literature supports that serum GGT determination was far more sensitive indicator of hepatic involvement than the transaminases or alkaline phosphatase, in the present study AST and ALT were also sensitive enough. Further it is observed that, single determination of GGT lacks specificity to detect alcoholism and associated hepatic involvement. Yet, GGT continues to remain the test that is sensitive and convenient to use. Combining it with other traditional markers such as AST and ALT can enhance t's diagnostic accuracy. It is also true that USG finding of liver abnormality are of value only in presence of history of alcohol intake.

In 1964, Arthur and Bosten inter-hospital liver group in their study of 994 alcoholic patients demonstrated a close relation between heavy intake of alcohol and laennec's (fatty nutritional) cirrhosis19.

Saunders et al 20, in a prospective study from a defined population West Birmingham form 1959-76 found that alcoholic cirrhosis was increasing in that population and modern treatment did not have any effect on the mortality and only abstinence caused reduction in mortality.

Weill et al14, studied 107 patients of a detoxification centre and found 81% having high GGT. After alcohol withdrawal, GGT decreased in all but one. They also noted decrease in GGT in patients who had GGT below the reference level thus concluding that the test can be used even in cases where GGT is in normal reference level in initial examination.

Kaude et al21, in their study found that normal ultrasonographic findings do not always necessarily exclude the presence of hepatocellular disease, and sonography does not allow a differential diagnosis with regard to aetiology of hepatocellular disease. Nevertheless abnormal liver size (enlarged or small liver), changes of sonographic characteristics of the liver (increased echogenecity, reduced echo transmission, reduced number and caliber of portal and hepatic veins, presence of extra hepatic venous collaterals) and secondary finding such as ascites and splenomegaly support the ultrasonographic diagnosis of hepatocellular disease.

Taylor et al22, after comparing USG and histological changes on 22 alcoholics came to a conclusion that except for a minimal change, USG detected many of the pathological changes seen in alcoholic liver disease.

In chronic alcoholism fatty infiltration may be revealed by ultrasound examination despite absence of clinical manifestation and functional disorder of the liver. It was true in present study that most cases that had liver abnormality sonographically did not have any clinical or functional disorder of the liver.

This lack of correlation between clinical syndromes and pathological abnormalities enhances need for markers of alcoholism.

As there were increased levels of biochemical biochemical parameters in cases with and without liver changes ultrasonographically, it may mean biochemical changes precede liver morphological changes.

Therefore, if biochemical markers such as GGT, and LFTs are combined with
history of alcohol intake it will be of immense value in detecting and monitoring cases of alcohol dependence. In addition where these biological markers are raised it is worthwhile to do USG examination of liver for early detection of liver abnormality.

The strengths of the present study are, relatively large sample size and comparison between liver function tests and ultransonographic liver abnormality especially when similar studies have not been done in Indian patients. The weaknesses are lack of control group and lack of follow up investigations, which might have revealed a decrease in levels of enzymes after control, and or cessation of drinking.

CONCLUSION

It is concluded from the present study that the estimation of serum GGT can be useful and more cost-effective in diagnosing alcoholic liver diseases as it significantly rises in alcoholic liver disease. GGT is better than LFTs alone. However, these tests are known to have high specificity but low sensitivity and are of high value only in presence of history of intake of alcohol. Hence, the use of biological markers of alcohol drinking along with USG examination of liver may be of help for the risk assessment of Alcoholic Liver Disease.

REFERENCES

1. Otto M Lesch, M. Benda, K. Gutierrez, H. Walter. Craving for alcohol dependence. In basic and clinical science of mental and addictive disorders, Ed. L. L. Judd, B. Saletu, V. Filip, Bibliotheca Psychatrica. 1997, No.167: 136-147 pp.
2. Paul O Cleary, Merle- Miller, Booker T.Bush, Marie Warburg, Thomas L.Delbanco, Mark D. Aronson, Prevalence of recognition of Alcohol abuse in Primary care population. 1998. Am J Med, 85: 466-471.
3. Marc A Schukit. Alcohol Related Disorders in Kaplan and Saddock's Comprehensive Textbook of Psychiatry, Ed: Benjamin S. Sadock and Vergenia A Sadock, 7th Ed edition, Philadelphia Lippincott Williams &Willkins, 2000: 935-965. 657-658pp.
4. Vasudevan DM, Sreekumari S, Iso-enzymes and clinical enzymology Textbook of Biochemistry (for medical students)2005 4th editionNewDelhiJaypee Brothers Medical Publishers (P) Ltd:57
5. Sherlock S, Alcohol and the liver In: Sherlock S, Ed. Diseases of the liver and the biliary system.1995. 6th edition London Blackwell Publications:385-403.
6. Singh RB, Ghosh S, Niaz MA, Rastogi V, Wander GS. Validation of tobacco and alcohol intake for the five city study and a proposed classification for Indians J Assoc Physicians India 1998 46:587-91.
7. Chen Yu H, Chan SP, Lu Ting C. The in vivo deleterious effects of ethanol Int J Sport Nutr Exerc Metab 2009 1:81-86.
8. Peterson K. Biomarkers for Alcohol use and abuse: A summary. Alcohol Res. Health.2004; 28:30-37.
9. Whitfield JB. Gamma GlutamylTransferase. Crit. Rev. Clin. Lab. Sci. 2001; 38:263-355.
10. Praveen Kumar and Robert Clark.Textbook of Medicine. 4th Edition, WB Sunders and Co, 1998:1135-1140pp.
11. Rosalki B. "Screening tests for Alcoholism". The Lancet, October,1973. 13: 843.
12. Mohammed Zein. Serum gamma glutamic transpeptidase as a diagnostic aid, Lancet,. 1970. 10:748-750.
13. Desai NG, M. Vaswani, BS Chavan, BM Tripathi, N. Kaw, Profile of liver dysfunction in Alcohol Dependence. IndJPsychiatry ,1996. 38(1):34-37.
14. Weill J, Schellenberg F, LE Goff A M, Benard JY, The decrease of low serum gamma gulatamyltransferase drug short term abstinence, Alcohol, 1988 5(1):1-3.
15. Michael J. Eckardt, Ryback RS, Rawlings RR, Graubard BI, Biochemical diagnosis of alcoholism; A test of the discriminating capabilities of gamma-glutamyltranspeptidase and mean corpuscular volume". JAMA, 1981. 246(23):2707-10.
16. Michael J. Eckardt, Rawlings RR, Ryback RS, Martin PR, Gottschalk LA, Effects of abstinence on the ability of clinical laboratory tests to identify male alcoholics. Am J Clin Path,1984. 82 (3):305-10.
17. Kristensson H, E. Trell, S. Eriksson, L. Hanik, B. Hood, Serum gamma glutamic transferase in Alcoholism. The Lancet, 1977.12 609.
18. Prathima Murthy, Guru SC, SM ChannaBasavnna, DK Subbakrishna, TaranathShetty, Erythrocyte Aldehyde Dehydrogenase- a potential marker for alcohol dependence. Ind J Psychiatry, 1996. 38 (1):38-42.
19. Arthur J et al, Natural History of Cirrhosis. New Engl J Med, 1964, 1271 (23): 1173-79.
20. JB Sunders, JRF Walters, P. Davies, A. Paton, A 20 year prospective study of cirrhosis. Br Med J, 1981, 282 (24):263-266.
21. Kaude JV, Cohen OR, Wright PG, Ultrasonography in hepatocellular disease. Radiologe, 1980, 20(7):347-54.
22. Taylor KJ, Gorellick FS, Rosenfield AT, Riley CA, ultrasonography of alcoholic liver disease with histological correlation. Radiology,1981, 141 (1):157-61.