

Study activity of serum gamma glutamyl transferase enzyme as a diagnostic biomarker in alcoholic hepatitis

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ABSTRACT :

Serum gamma glutamyl transferase. It is a reliable diagnostic marker of alcohol ingestion which is one of the most sensitive and most commonly employed biochemical marker of alcohol consumption. This study was carried out with 30 alcoholic and 30 normal non-alcoholic male as control subject. A significant correlation in the level of serum GGT is observed in alcoholics (68.33 ± 16.7) when compared with the normal subjects (19.31 ± 10.20) with p value ($p < 0.05$). Measurement of GGT enzyme activity in serum appears to be a sensitive index with low specificity in the diagnosis of alcoholics with hepatitis when correlated clinically.

Keywords: Alcoholic hepatitis, Gamma transferase or transpeptidase (GGT or γ -GTT).

INTRODUCTION:

A wide variety of biochemical and hematological parameters are affected by regular excessive alcohol consumption. GGT is a glycoprotein enzyme situated on the cell membrane in several tissues. It is possibly involved in reabsorption of glutathione from the glomerular filtrate and in protection against oxidative stress, via maintenance of intracellular glutathione levels [1]. Normally, small amounts of GGT are released from the cell membrane into the circulation. In people with repeated excessive alcohol consumption, there may be increased release of GGT from the cell membrane. Increases with inflammation and liver cell damage, there may also be cell necrosis with release of the enzyme. 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 [2]. GGT may elevate because of increased synthesis or accelerated release from damaged or dead liver cells. It seems to primarily indicate continuous, rather than episodic, heavy drinking, although a few moderate drinkers also produce elevated levels of GGT [3]. Excessive drinking is not the only cause of elevated GGT levels; they may also rise as a result of most hepatobiliary disorders, obesity, diabetes, hypertension, and hypertriglyceridemia [4]. There are also large numbers of false negatives for GGT. For example, Brenner *et al.* (1997) [5], observed that only 22.5 percent of construction workers drinking an average of 50–99 g/d had elevated. A variety of liver enzymes as-

sist in the diagnosis of alcohol addiction; including, gamma-glutamyl transferase (GGT), the most sensitive and widely employed marker, alanine aminotransferase (ALT) and aspartate aminotransferase (AST). GGT is one of the longest established biochemical tests for excessive alcohol consumption. GGT is an enzyme in bile, which is induced to rise by alcohol and serum levels due to liver damage [6].

MATERIAL AND METHOD:

Study population

A total of 60 male were used for this study (30 heavy alcoholic male, 30 nonalcoholic as control group).

Blood sample collection and laboratory method

Venous blood samples were collected from alcoholic and nonalcoholic male chosen from Khartoum city. After collection, the samples were collected in heparin container to measure the activity of GGT enzyme.

GGT were measured spectrophotometrically by (γ glutamyl transferase kinetic method kits) from bio system.

Statistical analysis

Statistical analysis was performed by using the statistical package for social science (SPSS). Results were presented as mean \pm SD. ANOVA was used to compare mean of different numerical variables, to determine the activity of GGT enzyme in heavy alcoholism.

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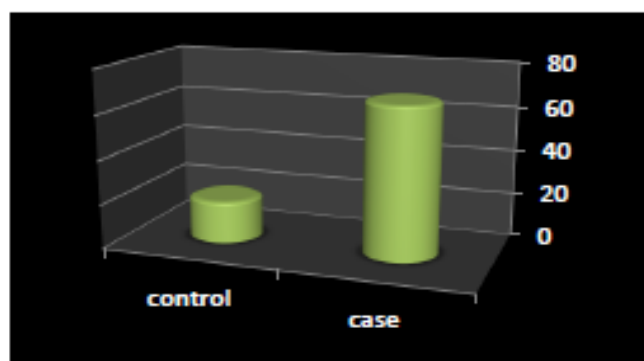
Conflict of interest: Authors reported none

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RESULTS:**Table 1:** Show activity serum GGT level in alcoholic comparing with non alcoholic male.

	Mean of GGT U/L	±SD
Case (alcoholism)	68.33 U/L	18.67
Control	19.31 U/L	10.20

**FIG 1:** Show activity serum GGT level in alcoholic comparing with non alcoholic male.**DISCUSSION:**

GGT is extremely sensitive to alcohol use and serum GGT is one of the best markers for chronic alcohol consumption, which has a relatively high sensitivity and specificity [7]. When the increase in GGT is two or more times greater than the increase in ALP, the source of the ALP is considered to be from the liver. When the increase in GGT is five or more times greater than the increase in ALP, this points to a diagnosis of alcoholic hepatitis [8]. The serum level of this enzyme gets elevated in cholestasis and hepatobiliary disorder and by drugs including alcohol possibly due to enzyme induction. Levels parallel serum ALP in cholestasis and may be used to confirm that a raised serum ALP is of hepatobiliary origin [9]. Especially high levels of serum GGT are seen in patients with severe alcoholic liver disease though they may fall in the later stages of cirrhosis. [10]. The serum GGT is markedly elevated in patients with alcoholic liver disease and primary biliary cirrhosis whereas mean hepatic GGT is significantly elevated only in the alcoholic liver disease group [11]. Serum GGT is the most sensitive, most widely employed marker of alcohol consumption. It is more likely to be elevated in regular rather than episodic drinkers [12]. An isolated rise in serum GGT is seen in patients with alcohol abuse, even without liver disease perhaps because of microsomal enzyme induction. More often there is steatosis. In fibrosis, cirrhosis and hepatitis due to alcohol, other liver enzymes are elevated in conjunction with GGT. [13]

Matsuda et al in 1993 classified GGT responses to alcoholic drinking into 3 groups: non response, mild response and hyper response. In alcoholic liver disease non responders were scarcely found and the response of GGT tended to increase in parallel with progression of liver disease [14] still some workers find that assay of GGT in serum is a misleading test and measurement of hepatic mitochondrial AST as a new marker enzyme in chronic alcoholism. However, the results of the present investigation signify the importance of measurement of serum GGT a diagnostic

Marker in alcoholic hepatitis. There are no reliable markers to detect heavy drinking or as a tool to control abstinence compliance in alcoholic treatments. The Mean Corpuscular Volume (MCV), and the gammaglutamyl transpeptidase (GGT), are widely used although their predictive value is somewhat limited due to their low specificity [15] this marker may be very useful in opportunistic case finding, in motivating patients to change drinking habit and in monitoring the treatment response.

CONCLUSION:

GGT enzyme having limited sensitivity and specificity in detection of excessive drinking, it also provides valuable data on complications of drinking that may be affected by drinking and, in some cases determination of serum GGT in alcoholic hepatitis will be a useful diagnostic tool if used judiciously and correlated clinically. Also to be noted that estimation of GGT is more informative in detecting alcoholism if it is used along with other biochemical parameters like ALT, AST, ALP, MCV.

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