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Estimation of GOT, GPT and ALP in type 1 Diabetes Mellitus Patients

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A B S T R A C T

Background: In comparison to the broader public, patients with diabetes are more likely to have elevated liver enzymes.Alcoholic hepatosteatosis that is not caused by alcohol is frequently seen in this syndrome.
Materials and Methods: In a cross-sectional study in the Kirkuk governorate of Iraq, 25 patients who are type 1 diabetes and 26 healthy individuals served as the control group. Both groups completed questionnaires that asked about their age, weight, body mass index (BMI), and checked their liver enzymes GOT, GPT, and ALT.
Results: The study discovered that 19 patients, or 76%, fell within the normal range (BMI 25), whereas 5 patients, or 20%, were overweight, and 1 patient, or 4%, was obese. The study also found no association between GPT and gender, but a strong substantial correlation between GOT and gender. There is no association between diabetes patients' gender and GPT. Additionally, this study demonstrated a high significant ($P \leq 0.001$) rise in ALP value (72.05±7.74) IU/L versus (62.4±7.38) IU/L for the control group, but a significant ($P \leq 0.05$) rise in GOT (24.25±4.13) IU/L so GPT (31.8±6.1) IU/L values for patients compared with the control group(21.3±4.95 and 26.7±7.28 IU/L respectively).
Conclusion: The type 1 diabetic patients could be at danger for CVD due to possible obesity. GOT, GPT, and ALP values were elevated in the sick set than in healthy group. Male patients had higher GOT and GPT enzyme levels than female patients.

Introduction

The destruction of the insulin-producing pancreatic cells by the immune system that results in chronicity of hyperglycemia as well a lifelong need for the exogenous insulin (T1D) [1] Type 1 diabetes (T1D) typically manifests at a elder age, in contrast to the diabetes type 2 (T2D), which denotes a lengthy period of diabetes. T1D requires lifelong devotion to treatment, which is challenging to achieve, especially during adolescence [2] To the general population comparison, diabetes individuals have a higher prevalence of liver enzyme increase. Non-alcoholic hepatosteatosis and this disease are frequently connected [3]

The extremely rare condition known as glycogenic hepatopathy (GH) can also result in increased liver enzymes, particularly in those peoples with type 1 diabetes. Hepatomegaly and abnormal liver function are brought on by GH, which develops as a result of an excessive and permanent accumulation of glycogen in the hepatocytes [4]

Hepatic glycogenosis (HG) is a very uncommon complication of type 1 diabetes mellitus (T1D) that is defined by the abnormal storage of glycogen in hepatocytes [5] Mauriac's syndrome (MS) is an uncommon condition characterized by hepatomegaly with elevated transaminases, puberty, and growth failure, Dwarfism, dyslipidaemia, and insulin-like growth factor 1 deficiency, and cushingoid characteristics , was first identified in children as have reloading of glycogen in the liver in 1930 [6,7] MS has been associated with inadequate nutrition, fragile glycaemic control, and poor insulin compliance in children and adolescents [9] At the moment, HG is a condition that can strike at any age and manifest without having all of the symptoms that are listed for MS. Hepatomegaly in young T1D patients is occasionally thought to be caused by HG [10]

Less research has been done on T1D-associated hepatopathy and T2D-associated hepatopathy, respectively. NAFLD Nonalcoholic fatty liver disease concerned the most important the liver disease chronicity in this context. NAFLD is defined by substantial formation of lipid droplets in hepatocytes without known steatosis causatives, such as the consumption of medicines steatogenic or alcohol [11]

However, a growing body of research indicates that people who are T1D can also have a higher chance of developing NAFLD. This may be partially because these patients tend to have metabolic risk factors more frequently. like obesity and metabolic, syndrome, but it may also be because they have conditions unique to T1D that can promote metabolic dysfunction. Additionally, abnormalities in hepatic enzymes or the imaging tests that indicate hidden hepatopathy have frequently been reported [12]

In this study, the liver, enzymes glutamic-,oxaloacetic ,transaminase (GOT), glutamic,-pyruvic transaminase, (GPT), and alkaline, phosphatase (ALP) were evaluated in type, 1 .diabetes mellitus patients and compared to those in a healthy group,.

Material ,and Methods

A cross-sectional study was done on 25 people who are type 1 .diabetes who have had the disease for a long time and whose fasting. Plasma. Glucose (FPG) was less than 126, mg/.dl in Kirkuk Governorate, Iraq. The control group consisted of 26 healthy people. Patients who are type one diabetes, between the ages of 11 and 60 were included in this study, along with a control group of similar age. Both groups completed questionnaires about their age, weight, body mass index (BMI), and liver enzymes (GOT, GPT, and ALT), with the exception of those who had a history of liver disease, excessive weight, thyroid gland abnormalities, cancer, or malignant anemia.

Each volunteer in this study provided 5 ml of venous blood, which was drawn using a disposable plastic syringe. Blood was injected into a flat container, allowed to coagulate, and then extracted. Before usage, the serum was stored sterile at -20 ° C. The Mindray BA-88A semi-outo chemical analyzer was used to evaluate and examine GOT, GPT, and ALP.

Statistics:

Comparing controls and patients was done using an unpaired, t-,test. $P \leq 0.05$ was considered significant. Every result, was expressed as mean ± S.D.

Results and Discussion

This study includes a patient group of 25 (14 men and 11 women) and a control group of 26 (14 men and 12 women) who are healthy. both between the ages of 11 and 60.

The patients' mean age was 24.2± 14.45 and 26.65± 11.55 for the healthy group, respectively, showing no significant age difference between the two groups. According to the study's findings on body mass index (BMI), 19 patients (76%) were within the acceptable range (BMI 25), while 5 patients (20%) and 1 patient (4%), respectively, were obese. As it shown ,in table .(1):

Table 1. Clinical and demographic features of diabetic patients and normal controls

Parameter	Patients (25) Mean ± SD	Control group(26) Mean ± SD
Age(yrs)	24.2±14.45	26.65±11.55
Standard (BMI < 25)	19	19
Overweight (BMI > 25)	5	5
Obesity (BMI > 30)	1	2

People who are type, 1 diabetes may deliver peripheral insulin, avoiding hepatic effects, and perhaps resulting in hyperinsulinemia and fat deposition in peripheral tissues. This is a another explanation for the increase in weight caused by insulin. Obesity is a significant contributor to the Type ,2 .diabetes risk , cardiovascular conditions and specific cancers , and early death [13–16] Obesity is also strongly linked to negative consequences in terms of mental health, including anxiety, depression, and self-harming behaviors[17] In the research by Edqvist and associates [18], 26125 type, 1 diabetic from 1998 to 2012, participants in the Swedish National Diabetes Registry (mean age 33 years, 45% women) were followed to assess their risk of significant cardiovascular events, such as death, from cardiovascular disease, heart failure hospitalizations, and other outcomes.

The study clearly demonstrated a substantial association between GOT and gender, but not between GPT and gender of diabetic patients. As its shown in table (2):

Table 2: Correlation between GOT, GPT and gender of type 1 diabetes patients

Gender	GOT		GPT	
	Mean±SD	p-value	Mean±SD	p-value
Male	74.5±7.06	P ≤ 0.05	31.75±6.51	NS
Female	58.20±22.5		27.0±9.78	

Thus, the current study revealed a high significant (P 0.001) rise in ALP value (72.057.74) IU/L versus (62.47.38) IU/L for the control group, compared with both GOT (24.254.13) IU/L and GPT (31.86.1) IU/L values for the patients compared with the control group (Table 3):

Table 3: Biochemistry in diabetic patients and healthy group

Test	Patients (25) Mean ± SD	Control group(26) Mean ± SD	P value
GOT IU/L	24.25±4.13	21.3±4.95	P ≤ 0.05
GPT IU/L	31.8±6.1	26.7±7.28	P ≤ 0.05
ALP IU/L	72.05±7.74	62.4±7.38	P ≤ 0.001

It was possible to discriminate between significant fibrosis and no or mild fibrosis using the correlation between the serum AST (GOT) level and the stage of fibrosis. Carter-Kent and others. [19] A team from Al-Mustaqbal University College in Iraq conducted research that supports our findings about GOT enzyme increase in type 1 diabetes mellitus. Additionally, studies show that metabolic syndrome and its clinical manifestations, such as cardiovascular disease and type I and type II diabetes, are connected to elevated activity of the enzyme (GOT) [20]

NAFLD has been associated with elevated plasma levels of the liver enzyme ALT (GPT), which is also utilized as a marker for hepatocellular damage [21] According to two studies, 10–35% of people with type, 1 diabetes. had blood ALT levels that are higher than normal [22]

Correlation between GOT and BMI

Although theoretically a negative correlation, the association between our variables is only weak as indicated by the value of R, which is -0.2917.

Correlation between GPT and BMI

Although theoretically a positive correlation, the relationship between our variables is tenuous as indicated by the value of R, which is 0.0264.

Correlation between ALT and BMI

R has a value of -0.2299. Although it is theoretically a negative correlation, there is only a slight connection between our variables.

Conclusions

Our investigation came to the following conclusion:

1-Patients with type, 1 diabetes ,may be ,at risk for CVD due to possible obesity.

2-GOT, GPT, and ALP liver enzyme levels are elevated.

3-Male patients had higher GOT and GPT enzyme levels than female patients.

4-The association between GOT, GPT, ALP, and BMI as a whole is weak.

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