To Regulate the level of association of GGT with Lipid Profile and HbA1c in Type II Diabetes Mellitus Patients.

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Abstract

Background: Diabetes Mellitus is classified on the basis of the pathogenic process that leads to hyperglycemia, as opposed to earlier criteria such as age of onset or type of therapy. Type 2 DM is preceded by a period of abnormal glucose homeostasis classified as impaired fasting glucose (IFG) or impaired glucose tolerance (IGT). Gamma Glutamyl Transferase is involved in the transfer of amino acids across the cellular membrane and leukotriene metabolism. Given the clinical importance of an interaction between obesity and serum GGT concentrations in predicting type 2 diabetes, we evaluated possible interactions between BMI and serum GGT activity in predicting poor glycemic control and other common comorbidities of type 2 diabetes. Methods and Materials: This Study was conducted in Medicine ward of NIMS Hospital, Jaipur was considered. Approval to conduct the study was obtained from Institutional Ethics Committee before starting the study. Total number of 76 patients were considered which includes 54 males and 22 females. Only those who agreed to participate were taken. Conclusion: This Study shows the Significant Correlation between GGT with Lipid profile and HbA1c in Type 2 Diabetes Mellitus patients. These results are imperative as they back up that there is modest impact of GGT on lipid profile. Further studies with large sample size are needed to

Introduction

Diabetes Mellitus is classified on the basis of the pathogenic process that leads to hyperglycemia, as opposed to earlier criteria such as age of onset or type of therapy. The two board categories of diabetes mellitus are designated type I and type II.1 Distinct genetic and metabolic defects in insulin secretion give rise to the common phenotype of hyperglycemia in type 2 DM and have important potential therapeutic implications now that pharmacologic agents are available to target specific metabolic derangements. Type 2 DM is preceded by a period of abnormal glucose homeostasis classified as impaired fasting glucose (IFG) or impaired glucose tolerance (IGT).2 Gamma Glutamyl Transferase is present in the cell membranes of many tissues, including the kidneys, bile duct, pancreas, liver, spleen, heart, brain, and seminal vesicles.3 It is involved in the transfer of amino acids across the cellular membrane and leukotriene metabolism. It is also involved in glutathione metabolism by transferring the glutamyl moiety to a variety of acceptor molecules including water, certain Lamino acids, and peptides, leaving the cysteine product to preserve intracellular homeostasis of oxidative stress.4,5 Given the clinical importance of an interaction between obesity and serum GGT

concentrations in predicting type 2 diabetes, we evaluated possible interactions between BMI and serum GGT activity in predicting poor glycemic control and other common comorbidities of type 2 diabetes. We assessed whether the association of BMI with hypertension, atherogenic control varied significantly according to serum GGT activity in a large cohort of type II diabetic individual.6

Methods and Materials

This Study was conducted in medicine ward of NIMS Hospital, Jaipur was considered. Approval to conduct the study was obtained from Institutional Ethics Committee before starting the study. Total number of 76 patients were considered which includes 54 males and 22 females. Only those who agreed to participate were taken. Patients characteristics and basic data including age, sex, weight, height, smoking status, etc. A suitable data collection form was designed to collect and document the data. Collected data were analyzed by using IBM SPSS v2.0.

Results

Out of 76 patients, 54 were males and 22 were females.

Character	Q1 (n=13)	Q2 (n=30)	Q3 (n=23)	Q4 (n=10)	P value	Significance
Age (years)	54.31 ± 18.84	57.43 ± 8.83	52.39 ± 7.63	56.90 ± 10.48	> 0.05	NS
Uric Acid	5.38 ± 1.02	7.24 ± 10.24	4.87 ± 1.25	4.50 ± 1.03	> 0.05	NS
T. Lipid	550.31 ± 69.47	571.07 ± 116.96	568.65 ± 118.99	579.80 ± 106.31	> 0.05	NS
TC	169.34 ± 40.97	187.47 ± 40.70	177.13 ± 30.08	168.40 ± 47.93	> 0.05	NS
TPL	177 ± 33.32	186.57 ± 43.12	185.17 ± 41.06	193.20 ± 48.34	> 0.05	NS
TG	126.38 ± 49.81	119.83 ± 50.29	131.26 ± 58.95	125 ± 34.41	> 0.05	NS
HDL	45.08 ± 6.22	45.40 ± 6.50	48.70 ± 5.34	39.80 ± 6.21	> 0.05	Sig
LDL	104.34 ± 21.17	83.13 ± 26.27	96.48 ± 18.01	100.98 ± 39.93	> 0.05	Sig

VLDL	25.92 ± 4.89	22.72 ± 6.08	23.19 ± 5.54	23 ± 4.94	> 0.05	Sig
HbA1c	6.22 ± 1.36	6.94 ± 2.50	6.71 ± 1.86	6.55 ± 2.19	> 0.05	Sig
BMI	27.60 ± 3.89	27.60 ± 3.36	26.90 ± 3.51	28.50 ± 3.94	> 0.05	NS

Discussion

Although the association between serum levels of GGT and type 2 diabetes risk has been documented in several previous studies, to the best of our knowledge. In a population based study in Tehran, To-hidi et al have reported that median of GGT in subjects who did and did not develop diabetes after 3.5 years of follow-up was 16.9 U/L and 21.3 U/L, respectively. Results of
current study were in line with the study of Tohidi et al.7 Median of GGT in FDRs was similar to
those subjects who developed diabetes after 3.5 years of follow-up in Tehran. This may be due to
our studied population who were the first degree relatives of type 2 diabetes who are at higher risk for diabetes development. The mean of GGT in Iranian healthy volunteer blood donors men was reported to be 20.52 U/L by Khedmat et al.8 Mean of GGT in this study was higher in men than in women, which was similar to the Hisayama study.9 In the study of Khedmat et al in Iran, the prevalence of diabetes and also the presence of diabetes family history were not different regarding GGT quartile; however, it predicted diabetes after adjustment for family history of diabetic patients as well as some factors including, body mass index, waist circumference, waist to hip ratio, systolic blood pressure and diastolic blood pressure. Nakanishi et al investigated the association between serum GGT and risk of type 2 diabetes. The results of their investigation indicated that serum GGT may be an important predictor for developing type 2 diabetes mellitus and in accordance to our results, they concluded that the relative risk for impaired fasting glucose and type 2 diabetes increased as serum GGT increased.10 Recently, Sabanayagam et al have studied the association between serum GGT and diabetes mellitus in a nationally representative sample of US adults participating in the National Health and Nutrition Examination Survey (NHANES) (1999-2002), among 7,976 adults older than 20 years old; according to their results, serum GGT levels were found to be positively associated with diabetes mellitus.11 Kim et al in their study, in Korea, have shown that, the odds ratio of developing type 2 diabetes increased significantly with increasing GGT levels. In multiple logistic regression models adjusted for different variables, the highest quartile of GGT remained significantly associated with type 2 diabetes. They concluded that, increased serum GGT is independent and also additive risk factor for the development of diabetes in subjects without fatty liver or hepatic Dysfunction.12 Doi et al in Japan, have studied the relationship between liver enzymes and the development of diabetes in a general Japanese population. Their findings suggest that serum GGT concentration consider as a strong predictor of diabetes in the general population, independent of other known risk factors.13 There was a significant correlation between studied variables in our study and GGT, especially in higher quartile of GGT. The findings were in line with the results of Kim et al study.12

Conclusion

This Study shows the Significant Correlation between GGT with Lipid profile and HbA1c in Type 2 Diabetes Mellitus patients. These results are imperative as they back up that there is modest impact of GGT on lipid profile. Further studies with large sample size are needed to identify the causes of obesity that would help in better understanding of its influence on lipid profile.

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