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Liver enzymes in patients with Type 2 Diabetes Mellitus: A cross sectional study

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ABSTRACT

Type 2 diabetes patients will have a higher incidence of abnormal liver enzymes than individuals who do not have diabetes. Aminotransferases, such as alanine aminotransferase and aspartate aminotransferase serve as a marker of hepatocyte injury. Alkaline phosphatase, γ -glutamyl transpeptidase, and bilirubin act as markers of biliary function and cholestasis. Albumin and prothrombin reflect liver synthetic function. The aim of our study was to assess the profile of liver enzymes in subjects with T2DM. It is a cross-sectional study, where 100 Type 2 diabetes patients attending the Medical OP, NRI General Hospital aged between 40 – 69 yrs were included in the study. A blood sample was collected from all the patients to analyze FPG, PPPG and liver enzymes. The data were analyzed and presented as means \pm SD. Statistical analyses were done using t-tests, Pearson's correlation. $P < 0.05$ was considered significant. In 47% Type 2 diabetes patient's elevated liver enzymes were seen. Mean levels of liver enzymes were higher in men than those in women (26.0 ± 24.8 vs. 21.4 ± 16.0 IU/l in AST, 32.8 ± 20.1 vs. 26.3 ± 13.1 IU/l in ALT), but in ALP, bilirubin and albumin levels there is no mean elevation and no significant difference between male and female. In this study, we found the highest incidence of mild elevated transaminases in Type 2 diabetes patients. Increased activity of liver enzymes, particularly ALT was associated with an increase in developing the insulin resistance and further makes diabetes worsen. So, estimation of liver enzymes in Type 2 diabetes patients may be helpful in the treatment process.

Keywords— Aminotransferases, Alanine Aminotransferase, Aspartate Aminotransferase, Type 2 Diabetes

1. INTRODUCTION

Type 2 diabetes patients will have a higher incidence of abnormal liver enzymes than individuals who do not have diabetes. Liver function tests are commonly used in clinical practice to screen for liver disease, monitor the progression of liver disease, and monitor the effects of hepatotoxic drugs. Increased activities of liver enzymes such as aspartate aminotransferase, alanine aminotransferase, are indicators of hepatocellular injury. Alkaline phosphatase, γ -glutamyl transpeptidase, and bilirubin act as markers of biliary function and cholestasis. Albumin and prothrombin reflect liver synthetic function. Chronic mild elevation of transaminases cross-sectional frequently found in type 2 diabetic patients. Increased activity of these markers is associated with insulin resistance² metabolic syndrome and type 2 diabetes³⁻⁶. The aim of our study was to assess the liver enzymes in subjects with T2DM.

2. MATERIALS AND METHODS

It is a cross-sectional study, where 100 Type 2 diabetes patients attending the Medical OP, NRI General Hospital aged between 40–69 yrs were included in the study. 5ml of the blood sample was collected from all the patients to analyze Fasting Plasma Glucose(FPG, Post Prandial Plasma Glucose(PPPG) and liver function tests like Aspartate aminotransferase(AST), Alanine aminotransferase(ALT), Alkaline phosphatase(ALP), Bilirubin and Albumin on Dade dimension fully auto analyzer. The data were analyzed and presented as means \pm SD. Statistical analysis was done using t-tests. $P < 0.05$ was considered significant.

3. RESULTS

Mean \pm SD age was 47.4 ± 7.7 and 53.1 ± 8.4 years in men and women, respectively. In 47% Type 2 diabetes patient's elevated liver enzymes were seen. Mean levels of liver enzyme activities were higher in men than those in women (26.0 ± 24.8 vs. 21.4 ± 16.0 IU/l in AST, 32.8 ± 20.1 vs. 26.3 ± 13.1 IU/l in ALT). But in ALP, bilirubin and albumin there is no mean elevation and no significant difference between male and female. The mean FPG and PPPG were higher in both male and female Diabetic patients and there is a significant difference between them.

4. DISCUSSION

The results in the present study support the previous studies reporting an association between abnormal liver function and type 2 diabetes, conducted mainly in Caucasian populations⁷. The liver is an important site for insulin clearance and production of inflammatory cytokines⁸. Other researchers have reported an association between elevated ALT activity and fatty liver in obesity, insulin resistance, and type 2 diabetes⁹. Elevated liver enzyme activity may also reflect inflammation, which impairs insulin signalling¹⁰. Shreyas Saligram et al. Study shows a high incidence of elevated ALT in a well-defined population of newly diagnosed people with T2DM¹¹. Elevated ALT was found to have a statistically significant association with increasing age and obesity¹¹ which goes in accordance with our study where the mean BMI was increased and has a positive correlation with AST levels.

5. CONCLUSION

In this study, we found the highest incidence of elevated transaminases in Type 2 diabetes patients. Increased activity of liver enzymes, particularly ALT was associated with an increase in developing the insulin resistance and further makes diabetes worsen. So, estimation of liver enzymes in Type 2 diabetes patients may be helpful in the treatment process.

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Table.1: Baseline characters and liver function tests between male and female Diabetic patients

	Male (42)	Female (58)	p-value
AGE (yrs)	47.4 ± 7.7	53.1 ± 8.4	
BMI(kg/m ²)	25.4±3.51	23.3±3.37	<0.001
FPG (mg/dl)	119± 27.4	124± 31.2	<0.001
PPPG(mg/dl)	152± 35.8	165± 36.1	<0.001
ALT (IU/L)	32.8 ± 20.1	26.3 ± 13.1	<0.001
AST(IU/L)	26.0 ± 24.8	20.4 ± 16.0	<0.001
ALP (IU/L)	89 ±15.7	86 ±14.6	0.06
BILIRUBIN (mg/dl)	0.8 ±0.2	0.8 ±0.1	0.94
ALBUMIN (gm/dl)	3.4 ±0.85	3.2 ±0.72	0.07

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