STUDY OF EFFECTS OF HYPERGLYCAEMIA ON ALANINE AMINOTRANSFERASE LEVEL IN TYPE-2 DIABETES MELLITUS PATIENTS.

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Abstracts: **Background:** The spectrum of liver diseases which ranges from innocuous enzyme elevation to progressive chronic liver disease has been described in association with hyperglycemia. Mild chronic elevations of alanine aminotransferase (ALT) often reflect the underlying insulin resistance which is common cause of type2 diabetes mellitus. **Aims:** To study the correlation between Glycaemic controls (PP2BS) and the duration of hyperglycemia with respect to the ALT levels in type 2 diabetes patients. **Study Design:** A randomized case study **Materials and methods:** fifty eight patients with diabetes type 2 as per ADA criteria were included in study and patients with: i) Viral marker for HBV and HCV was positive, ii) alcoholic, iii)h/o chronic use of drugs that causes liver function alteration. (glitazone, acarbose, tamoxifen, amiodorone, diltiazem, steroids and statins) were excluded from the study. Post prandial blood sugar and Liver function tests were done. The results were compared by using suitable statistical methods. (Student's unpaired t test and Pearson's correlation cofficient)**Results:** The level of alanine aminotransferase (ALT) was high in the cases as compared to those in the controls. There was a positive co-relation between PP2BS and the duration of hyperglycemia with respect to the ALT levels. **Conclusion:** There is a positive correlation between PP2BS (post prandial blood sugar) and the duration of hyperglycemia with respect to the ALT levels.

Key words: Hyperglycemia, Liver function tests (LFT), ALT, and PP2BS.

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Introduction:

A currently the number of cases of diabetes worldwide is estimated to be around 30 million; of these more than 90 per cent are type 2 diabetes[1]. The liver has a major role in glucose homeostasis. Altered insulin levels may influence hepatocyte function and integrity in some diabetic patients[2]. The spectrum of liver diseases which ranges from innocuous enzyme elevation to progressive chronic liver disease has been described in association with type 2 diabetes mellitus. The chronic mild elevation of the transaminases often reflects the underlying insulin resistance[3].

Material and Methods:

Fifty eight patients with type 2 diabetes mellitus who attended the Medical Outpatients Department at civil Hospital, Rajkot, Gujarat, west India from September 2012 to October 2012 were taken up for the study, after considering the inclusion and exclusion criteria. The inclusion criteria includes type2 diabetes mellitus as per ADA criteria and exclusion criteria: i) Viral marker for HBV and HCV was negative, ii) Non alcoholic, , iii) No h/o chronic use of drugs that causes liver function alteration.(glitazone, acarbose, tamoxifen, amiodorone, diltiazem, steroids and statins)[4].

This study was approved by the institutional ethics committee (IEC) and an informed consent was obtained from the study participants. A complete clinical examination was done, with special reference to the presence of the right upper quadrant (RUQ) abdominal discomfort and hepatomegaly. All the patients were investigated for blood counts; PP2BS (post prandial blood sugar at 2 hour). Any measurement above this was considered as enzymes were measured as per the IFCC's (International Federation for Clinical Chemistry's) kinetic method and total bilirubin was measured by using the Diphylline diazonium salt method. LFT (liver function test) - The liver enzymes were measured .Patients with PP2BS <140 mg/dl were taken as control group and with PP2BS >=140 mg/dl were taken as case group[5].

Result:

Fifty eight patients of DM-2 were studied, among which 44 were having PP2BS=<140mg/dl (control group) and 14 were having PP2BS> 140 mg/dl (case group).

The unpaired t- test was done, in which p value=0.0195 * stastaticaly significant (<0.05).

And the Pearson's correlation co-efficient(r) calculated was 0.2931, which showed a positive co-relation for PP2BS and the ALT levels**.**

Among control group(<=140mg/dl) the unpaired t-test shows insignificant p value (0.4089)and Pearson's correlation calculated , which shows negative correlation for the duration of type 2 DM and the ALT levels. While in case group (>140mgl/dl) unpaired t-test shows significant p value* (0.0029) and the value of the correlation co-efficient, which shows a positive co-relation between duration of DM-2 and ALT level.

There is no correlation between duration of DM-2 and ALT level among control. While positive correlation observed between duration of DM-2 and ALT level among case.

Table-1: showing different parameters between case and control

Parameters	PP2BS<140 mg/dl (control) Mean±SD	PP2BS>=140 mg/dl (case) Mean±SD
Age(years)	51.71±5.553	50.27±4.541
PP2BS(mg/dl)	133.3±4.065	224.2±99.41
Duration(years)	4.143±1.875	5.250±2.253
ALT level(U/l)	32.07±17.77	66.98±53.09

Table-2: Analysis of co-relation between PPBS and ALT levels in type 2 diabetes. (Unpaired t test and Pearson's correlation coefficient)

PP2BS (mg/dl)	Level of ALT (U/L) Mean ±SD
<140 (control)	32.07±17.77
>=140(case)	54.69±53.09*
P value=0.0195(*), Pearson's correlation coefficient= (0.2931)	

[Table-3]: Analysis of correlation between duration of diabetes mellitus and ALT level (unpaired t test and Pearson's correlation coefficient)

Duration of diabetes type-2	ALT level U/l	
	Control (<140mg/dl)	Case (>=140mg/dl)
<5 years	34.80±19.95	36.56±35.12
>= 5 years	27.75±17.61	84.36±54.24*
	P=0.4089(NS), Pearson's correlation coefficient(r) =0.2398	P=0.0029(*), Pearson's correlation coefficient(r)=0.5630

Discussion:

In the present study, the mean age of the study group was 50.27±4.541 years. The mean age of the cases was 46.74±10.35 yrs in pal et al[4] and In the study of Akbar DH et al, the mean age of the study group was 54±12.8 yrs[6].

In the present study, there was a positive co-relation between PP2BS, the duration of type 2 diabetes and the ALT levels among the cases which is comparable to jayraman et al[7]and erbey et al[8].

Tolman et al found that elevation of alanine aminotransferase, while uncommon in apparently normal subject, is common in type 2 diabetes[9].

Salmela et al found Elevated ALT levels were associated with the onset of diabetes within the past 4 years[10].

The aminotransferase values and the common imaging tests such as liver ultrasound, computed tomography and magnetic resonance imaging are used in predicting the liver histology[11].

Vozarova et al found novel observation that ALT appear to have association with both hepatic insulin resistance and later decline in hepatic insulin sensitivity. Their findings indicate that high ALT level is a risk factor for type 2 diabetes and indicates potential role of hepatic gluconeogenesis

and/or inflammation in pathogenesis of type 2 diabetes[12].

In study of Harris et al, individual with type 2 diabetes have a higher incidence of liver function test abnormalities than individuals who do not have diabetes. Mild chronic elevation of alanine aminotransferase often reflects underlying insulin resistance. They also found that elevation of transaminase within three times the upper limits of normal is not a contraindication for starting oral hypoglycemic or lipid modifying therapy[13].

HbA1c is a better marker for longer control of hyperglycemia. It is advisable to compare glycemic status by HbA1c and Liver function tests in future.

Conclusion:

LFT abnormalities were common in diabetes. The ALT levels were significantly elevated. There was a positive correlation between the glycaemic control (PP2BS) and the duration of diabetes mellitus in poor glycaemic control with respect to the ALT levels in type 2 diabetes mellitus.

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