

## HEPATIC DYSFUNCTION IN T2DM

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### Abstract:

A study which was cross sectional, performed in Department of Physiology GRMC Gwalior and Department of Biotechnology, Vijayaraje institute of science and management, Jhansi road, Gwalior (MP). Total 100 patients of T2 diabetes in the OPD were evaluated for hepatic dysfunction. The cases who were diagnosed as type 2 diabetic, irrespective of duration of the diabetes were selected randomly.

Out of 100 patients, 54% had good glycemic control (HbA1c  $\leq$ 7) and 46% had poor glycemic control (HbA1c  $>$ 7).

About 62% of the patients had minimum 1 abnormality of the liver function tests.

Liver function test abnormalities showed a direct relationship with increasing duration of diabetes since diagnosis. It is duration not the age of diabetics that affects the liver functions.

Poor glycemic control directly affects the liver functions .

**Key Words** – type 2 diabetes, Hepatic dysfunction, liver function test, glycemic control.

### Introduction

T2DM is most common endocrinal disorder, and oldest disease killing the humanity day by day.

Today due to advance in research and better medical care diabetic persons are able to live their life as normal as a nondiabetic person. But as it is known that diabetes affects all the organs of body and liver is not spared by this killer disease. It is also well known that T2DM is found in 70% cirrhosis patient, and nowadays evidence suggests that T2DM may initiate and progress the CLD.<sup>1</sup> in this perspective we

decided to study the hepatic dysfunction in T2DM patients.

### Materials and methods

**Patients:** patients visiting OPD and IPD of J.A. group of hospitals and diagnosed as T2DM were selected randomly during the period of march 2017 to February 2018. Total 100 patients were selected.

**Inclusion criteria:** T2DM patients without any preexisting CLD

**Exclusion criteria:** T2DM patients who consume alcohol, any hepatotoxic drug, having any kind of illness which may affect the liver directly or indirectly.

**Collection of data:** A format was developed by us which include all the necessary biodata, history, clinical examination, investigations biochemical as well as sonographical.

**Statistical analysis:** The data thus obtained was compiled and transferred to Statistical Package Social Services (SPSS vs 18). The categorical variables were presented as frequencies and percentages. The quantitative variables were presented as means and standard deviations. Chi-square test was used as significance test for categorical variables. A regression analysis was used. A p value of <0.05 was considered as statistically significant.

**Results**

The mean age of the patients was 54.32 years. Majority of type 2 DM patients belonged to 41-60 years age group. Females outnumbered males in this study. The maximum duration of DM was 22 years and minimum duration was two month. Majority of males and females had diabetes for 1-10 years.

**Table 1 -Glycosylated haemoglobin levels of diabetic patients (n =100)**

Hba 1c	No of patients	Percentage
<7	54	54
>7	46	46

Out of 100 patients, 54% had good glycemic control (HbA1c ≤7) and 46% had poor glycemic control (HbA1c >7) (Table 1)

**Table 2. Relation Of Glycemic Control With Abnormal LFT**

No of abnormal LFT	Hba1c		Total
	<7%	>7%	
0	36	12	48
1	11	11	22
2	6	12	18
3	0	4	4
4	0	6	6
5	1	1	2
Total	54	46	100

As this table showing that more good is the glycemic

control healthier is the liver.

**Table 3- Relation between glycemic control and liver function tests**

Liver function tests	HBA1C		t Value	p Value
	<7 % Mean +/- SD	>7% Mean +/- SD		
Bilirubin	0.8+/- 0.16	1.0+/- 0.28	-1.7	0.076 NS
Direct Bilirubin	0.1+/-0.05	0.2+/-0.15	-3.2	0.0015 S
Total protein	7.0+/-0.35	7.0+/-0.35	-0.4	0.6 NS
Albumin	3.5+/-0.2	3.5+/-0.39	-0.7	0.4NS
SGOT	31.7+/-7.8	41.6+/-12.9	-3.1	0.001 S
SGPT	33.5+/-8.6	42.0+/-14.8	-3.3	0.0005 S
SAP	82.7 +/- 22.0	98.3+/-23.8	-2.3	0.002 S

This table showing that direct bilirubin is raised, SGOT, SGPT, and serum alkaline phosphatase is raised when there is T2DM.

**Discussion**

Due to better medical care T2DM patients live a longer life so have more complications. This study is trying to throw some light on hepatic dysfunctions in diabetics. In diabetics liver dysfunction is known complication. As per harris et.al.<sup>2</sup>, west et.al<sup>3</sup> showed that ALT raised up to 9.5% in this population that is up to 4 times in compared to general population. Salmela *et al*<sup>4</sup>. (1984) studied the liver function tests of 175 diabetic patients without chronic liver disease, where 57% were found to have at least one abnormal LFT, 27% had at least two abnormal LFTs. However, these increases in liver function values were rarely more than two times of the upper limit of normal. According to a study in Sudan<sup>5</sup>, where 50 diabetes patients and 30 normal control subjects were tested for liver function, the means of ALT, AST, γGT, total protein and albumin were reported to be significantly higher among diabetes compared to the control. However, the mean values were within the normal range. In this study, 22% had at least one abnormal liver function test (Idris *et al.*, 2011)<sup>5</sup>. Similar finding was also present in a study by Foster *et al.* (1980)<sup>6</sup>, in which the means of ALT, AST, ALP, γGT, bilirubin and albumin of 60 study subjects with diabetes were within the reference range. Glycylated haemoglobin (HbA1c) was estimated in all 100 diabetics to find out the glycemic control in patients with diabetics in this study, maximum number of patients

(54%) were in Group I (well controlled) followed by Group II (unsatisfactorily controlled) 46% of the patients. Our results bear out the close relation between diabetics and liver functions. If the liver is altered structurally in diabetes mellitus, some functional derangement is also expected. In our study, laboratory investigation revealed abnormal liver function tests (one or more abnormal LFT) in 52% of cases and 30% of our patients showed two or more abnormal liver function tests. In this study, age of the patient did not seem to have definite influence on effect of diabetes on liver function tests. But, the duration of diabetes did seem to have some influence on effect of diabetes on the functions of liver. This study found that as the duration of diabetes increases, there was increased frequency of abnormal liver function tests, indicating clearly that more the duration of diabetes, more the effect of diabetes on functions of liver.

This study next attempted to find out the relationship between glycemic control and incidence of hepatic dysfunction and found that glycemic control does seem to have a definite effect on hepatic dysfunction in diabetes.

These results show that poor the glycemic control, the frequency of abnormal liver function increases. About 18% of the cases had minimally raised bilirubin, all of them had total bilirubin value of less than 2 mg/dL and only one had value of 2 mg/dL. Fall in total protein in 11% and fall in albumin in 24% was noted.

## Conclusion

This study included 100 type 2 diabetes mellitus patients for detection of hepatic dysfunction using biochemical and radiological methods. Prevalence of minimum 1 LFT abnormality was 52% in this study. Patients with glycemic control HbA1c value >7 are at a greater risk for developing fatty liver and LFT abnormality. So it may be concluded that early detection and optimum control of diabetes mellitus is important in minimizing the effect of diabetes on liver like other organs. A larger trail of a longer follow up period is necessary to establish the prognosis of liver diseases caused by diabetes mellitus.

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