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Original Article

Evaluation of Liver Function Tests in Type2 Diabetic patients

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Abstract

This was a descriptive cross-sectional comparative study carried out in Department of Medicine, Rajshahi Medical College Hospital and Rajshahi Diabetic Association Hospital from July 2008 to June 2010. 100 (one hundred) diagnosed type2 diabetic patients and 30 apparently healthy people were included. All of those study population were free from taking any hepatoxic drugs and free from any preexisting liver disease. This exclusion was done by history, through clinical examination and relevant investigations. The prevalence of abnormal serum bilirubin, ALT, AST, Alkaline phosphatase, prothrombin time and S. albumin were 6%, 30%, 7%, 6%, 54% and 12% respectively in type2 diabetic patients and 00%, 3.3%, 00%, 6.7%, 10% and 3.3% respectively in normal people. All the LFTs of type 2 diabetic patients were mildly abnormal except 2 patients (2%) had moderate elevation of ALT, 7 patient (7%) had markedly prolonged PT, and 1 patient (1%) had moderately decreased s. albumin. In normal people all LFTs abnormalities were mild.

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Introduction

Diabetes mellitus is a common metabolic disorder characterized by hyperglycaemia due to absolute or relative deficiency of insulin. The world wide prevalence of DM has risen dramatically over the past two decades, from an estimated 30 million case in 1985 to 177 million in 2000. Based on current trends>360 million individuals will have diabetes by the year2030.[1] Diabetes mellitus is a growing health problem that causes significant morbidity and mortality.[2] Although the prevalence of both type 1 and type2 DM is increasing world wide, the prevalence of type2 DM is rising much, more rapidly.[3] The excess in free fatty acids found in the insulin- resistant state is known to be directly toxic to hepatocytes. The insulin-resistance state is also characterized by an increase in pro-inflammatory cytokines such as tumor necrosis factor-α (TNF- α), which may also contribute to hepatocellular injury.[4]

Material and Methods

It was a descriptive cross-sectional comparative study carried out in Department of medicine, Rajshahi Medial College Hospital and Rajshahi Diabetic Association Hospital from July, 2008 to June, 2010. 100 (one hundred) diagnosed type2 diabetic patients and 30 apparently healthy people. Diabetic patients were both sex and >40years of age.All of those study population were free from taking any hepatotoxic drugs and free from any preexisting liver disease. This exclusion was done by history, through clinical examination and relevant investigations like HBsAg (ELISA), Anti HCV(ELISA),USG. Serum bilirubin, ALT, AST, Alkaline phosphatase, prothrombin time and albumin were done to evaluate liver functions.

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Informed written consent was taken from each study people before inclusion. All results were expressed as mean or percentage where indicated.

Results

In case group out of 100, 61 (61%) were male and 39 (39%) were female; in control group out of 30, 19 (63.3%) were male and 11 (36.7%) were female. Mean age of type2 diabetic patients and normal healthy people were 54.06 and 55.30 years respectively.

The prevalence of abnormal serum bilirubin, ALT, AST, Alkaline phosphatase, prothrombin time and S. albumine were 6%, 30%, 7%, 6%, 54% and 12% respectively in type2 diabetic patients and 00%, 3.3%, 00%, 6.7%, 10% and 3.3% respectively in normal people.

All the LFTs were mildly abnormal except 2 patients (2%) had moderate elevation of ALT, 7 patient (7%) had markedly prolonged PT, and 1 patient (1%) had moderately decreased s. albumin of type2 diabetic patients. In normal people all LFTs abnormalities were mild.

Table-1**: Liver function tests results of type2 DM patients and control:**

Liver function tests	Type-2 diabetic patient (n=100) (mean±SD)	Control group (n=30) (mean±SD)	P-value
Serum bilirubin	0.7372±0.3218	0.5063±0.1831	<0.05
ALT	39.00±24.21	28.26±6.67	<0.001
AST	26.42±10.40	18.90±4.75	<0.001
S. Alkaline phosphatase	89.61±25.59	96.83±16.34	>0.05
Prothrombin time	16.46±2.78	14.23±1.04	<0.05
S.Albumin	4.10±0.51	4.21±0.27	>0.05

Table-II : **Frequency of LFTS abnormalities among type2 diabetic patients and control:**

Liver function tests	Type-2 diabetic patients		Control groups	
	Frequency	Percentage (%)	Frequency	Percentage
Serum bilirubin	06	06	00	00
ALT	30	30	01	3.3
AST	07	07	00	00
S. Alkaline phosphatase	06	06	02	6.7
Prothrombin time	54	54	03	10
S.Albumin	12	12	01	3.3

Table-III: Severity of liver function test in having abnormal liver function tests in type-2 diabetic patients.

Liver function tests	Total abnormalities	Mild change	Moderate change	Severe change
Serum bilirubin ↑	6	6↑	0	0
ALT↑	30	28↑	2↑↑	0
AST↑	7	7↑	0	0
S. Alkaline phosphatase↑	6	6↑	0	0
Prothrombin time↑	54	47↑	7↑↑	0
S.Albumin↓	12	11↓	1↓↓	0

Discussion

Type-2 diabetes mellitus is increasing throughout the world, particularly in Asia including Bangladesh.[1] Virtually the entire spectrum of liver disease is seen in patients with type-2 diabetes. This includes abnormal live enzymes, non alcoholic fatty liver disease, cirrhosis, hepatocellular carcinoma and acute liver failure.[5]

Salmela et al[4] showed in their study, 22.9% ALT and 10.2% serum bilirubin were elevated. In our study which were 30% and 6% respectively.Prevalence of ALT elevation was more and s.bilirubin elevation was less in our study. Their study showed BMI >25 kg/m^2, poor diabetic control and one set of diabetes within past 4 years had more elevated ALT, our study also show abnormal LFTs group had more BMI, poor diabetic control, and less duration diabetes then normal LFTS group. They also done liver biopsy of 68 patients of type-2 diabetes having abnormal LFTs. Of the 68 patients 5 had normal liver histology and 63 patients with abnormal liver histology, 48 had fatty liver or steatosis with non-specific inflammatory change, whereas 14 had evidence of fibrosis. In our study we did not done any liver biopsy.

This kind of study was done in USA[6], India[7,8], Pakistan[9], Iran[10]. Those studies showed abnormalities of liver function tests which reflect the excretory function (s.bilirubin, s.alkaline phosphate) and hepatocytes injury (ALT and AST), but did not showed any synthetic function abnormalities ie prothrombin time, and s.albumin level. We had also done tests which reflect the synthetic function of liver.

Conclusion

A high proportion of patients with type 2 diabetes mellitus in our country have abnormal liver function tests is related to high BMI and poor glycaemic control that may be a marker of NAFLD and insulin resistance. Such patients would thus warrant more intensive glycaemic control and obesity to prevent progression of significant liver diseases.

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