

A STUDY OF CLINICAL, BIOCHEMICAL AND SONOLOGICAL PROFILE OF NON-ALCOHOLIC FATTY LIVER DISEASE IN TYPE 2 DIABETES PATIENTS

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ABSTRACT

BACKGROUND

The Prevalence of Diabetes is increasing worldwide and is expected to affect 57 million adults in India by 2025. Virtually, the entire spectrum of liver disease is seen in patients with type 2 diabetes. This includes NAFLD, NASH and cirrhosis. Nearly, 70-80% of the diabetic subjects have been reported to have hepatic fat accumulation, referred to as NAFLD (Non Alcoholic Fatty Liver Disease). There are not enough studies done on hepatic status of diabetic patients in our country. Hence, this study aims to describe the hepatic profile of type 2 diabetic patients.

The aim of the study is to assess the clinical, biochemical and sonological profile of fatty liver in type 2 diabetes patients.

MATERIALS AND METHODS

Type 2 diabetes patients who are attending medical OPD (n=118) were taken as subjects. They underwent liver function tests, blood glucose levels and assessed by ultrasound examination of abdomen. Their diabetic duration and treatment history was also recorded.

RESULTS

Age wise and sex wise comparison of the liver function tests did not reveal any significant difference. Comparing mean blood glucose between those with or without fatty liver did not reveal any significant difference. There was no clinically significant difference between liver enzyme parameters among patients with fatty liver and those without fatty liver (as assessed by ultrasonogram). Significant number of females developed fatty liver disease as compared to males. Obesity was found to have a significant association with fatty liver disease. Only 6 patients among 60 patients of those with normal or underweight showed fatty liver change as compared to 44 patients. Among 58 patients of those with overweight or obese patients showed fatty liver change (assessed by ultrasonogram).

CONCLUSION

Obese persons are at greater risk of developing NAFLD. Females have high risk of developing fatty liver disease when compared to males. No significant correlation was found between age of the patient, duration of diabetes and NAFLD. Our present study did not find any correlation between liver enzyme parameters and degree of fatty liver. So, the conclusion is ultrasound examination of abdomen is the ideal diagnostic tool for detection of fatty liver disease especially in obese people, females and diabetic patients.

KEYWORDS

Obesity; Diabetes; Ultrasound; Females; Liver Enzymes; and Fatty Liver.

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BACKGROUND

The prevalence of diabetes is increasing worldwide and is expected to affect 57 million adults in India by 2025. Apart from kidney, eye, heart and blood vessels, liver is also indirectly related with diabetes mellitus. Virtually, the entire spectrum of liver disease is seen in patients with type 2

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diabetes. This includes abnormal liver enzymes, Non-Alcoholic Fatty Liver Disease (NAFLD), Non-Alcoholic Steatohepatitis (NASH), cirrhosis and acute liver failure.

Ludwig¹ introduced the term Non-Alcoholic Steatohepatitis (NASH) to describe the form of liver disease that is histologically indistinguishable from alcoholic hepatitis, but occurs in people who do not consume excess alcohol.

Nearly, 70-80% of the type 2 diabetic subjects have been reported to have hepatic fat accumulation referred to as NAFLD.² NAFLD represents a spectrum of diseases from simple fatty liver (steatosis), steatosis with inflammation and necrosis (NASH) and possible cirrhosis that occurs in people who drink little or no alcohol.



NAFLD affects more women than men and can be found in all age groups. Diabetes is now becoming most common association for NAFLD and cirrhosis. There is renewed interest in Non-Alcoholic Fatty Liver (NAFLD) recently because of its increased prevalence in type 2 diabetic subjects. It has been shown to be a predisposing factor for insulin resistance and hyperinsulinaemia, a major cause of cryptogenic cirrhosis and may even lead to hepatocellular carcinoma.³

There are not enough studies done on hepatic status of diabetic patients in our country. Hence, this study aims to describe the hepatic profile of type 2 diabetic patients.

AIM- To assess the clinical, biochemical and sonological profile of fatty liver in non-alcoholic patients with type 2 diabetes mellitus and to study the correlation between non-alcoholic fatty liver disease and type 2 diabetes mellitus.

MATERIALS AND METHODS

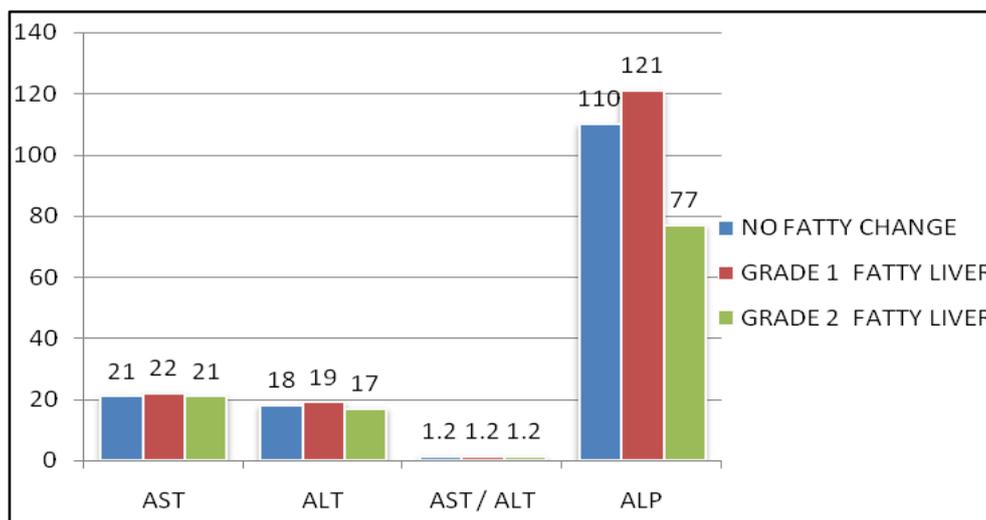
Patients of type 2 diabetes mellitus (n=118) attending NRI Hospital OPD either newly diagnosed or on follow up were

subjects. Diagnosis of type 2 diabetes mellitus was established according to the diagnostic criteria of American Diabetes Association (ADA).

Type 2 diabetes mellitus patients either new or on follow up were included in study. The type of oral hypoglycaemic drug intake, diabetes duration, height and weight were recorded and body mass index calculated. Patients were subjected to biochemical investigations to detect liver function tests, serum glucose levels and serum cholesterol levels. All patients were subjected to ultrasonogram of abdomen to assess the liver parenchyma, liver size, biliary and portal system.

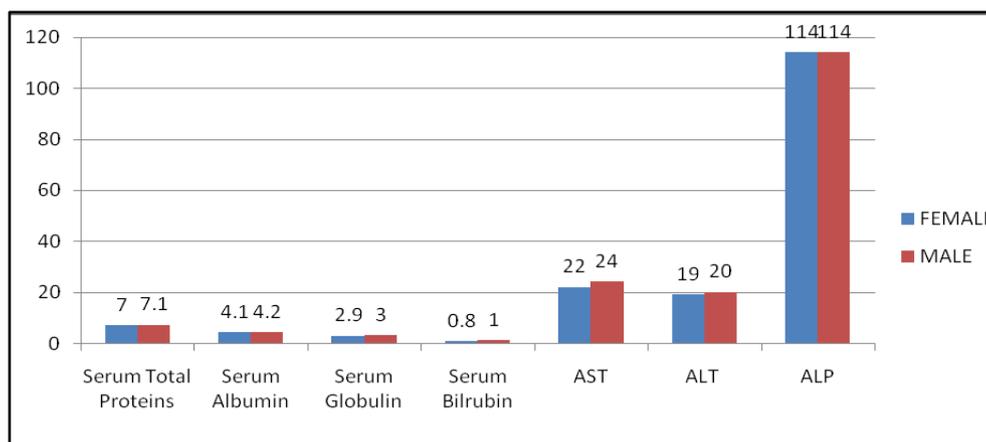
RESULTS

Mean Values of Liver Enzymes in Correlation with Grade of Fatty Liver Change- Our study did not find significant elevation of any of the liver enzymes. There was no clinically significant difference between liver enzyme parameters among patients with fatty liver and those without fatty liver (fatty liver as assessed by ultrasonogram).



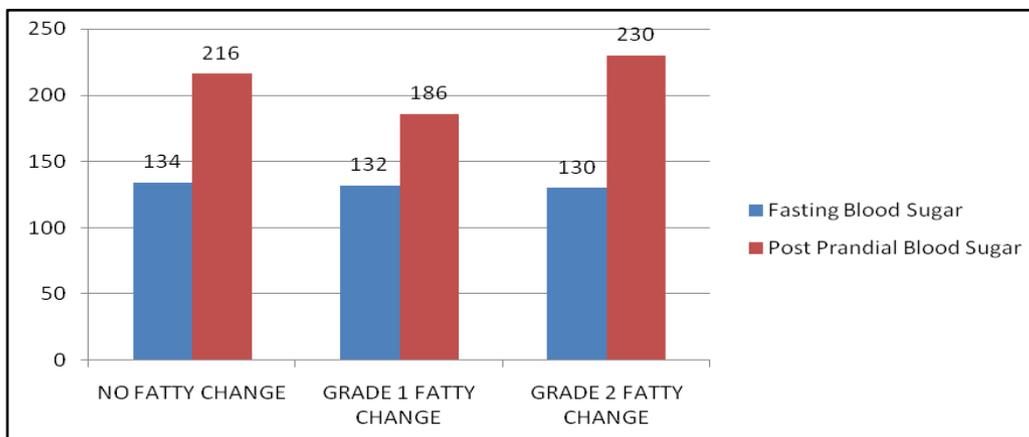
Graph 1. Mean Values of Liver Enzymes in Correlation with the Grade of Fatty Liver Disease

Age Wise and Sex Wise Comparison of Mean Values of Liver Function Tests- Age wise comparison of liver function tests revealed no significant difference between the various age classes. Sex wise comparison of the liver function tests revealed no significant difference between sexes.



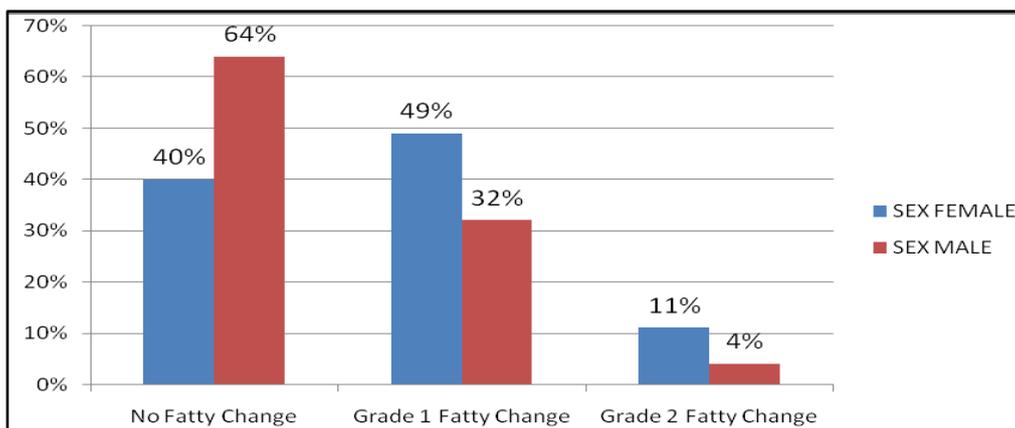
Graph 2. Sex Wise Comparison of Mean Values of Liver Function Tests

Comparison of Mean Blood Glucose Values with or without Fatty Liver Change- (As assessed by ultrasonogram) comparing the mean blood glucose levels between those with fatty liver and without fatty liver did not reveal any significant difference.



Graph 3. Comparison of Blood Glucose Levels with the Grade of Fatty Liver Change

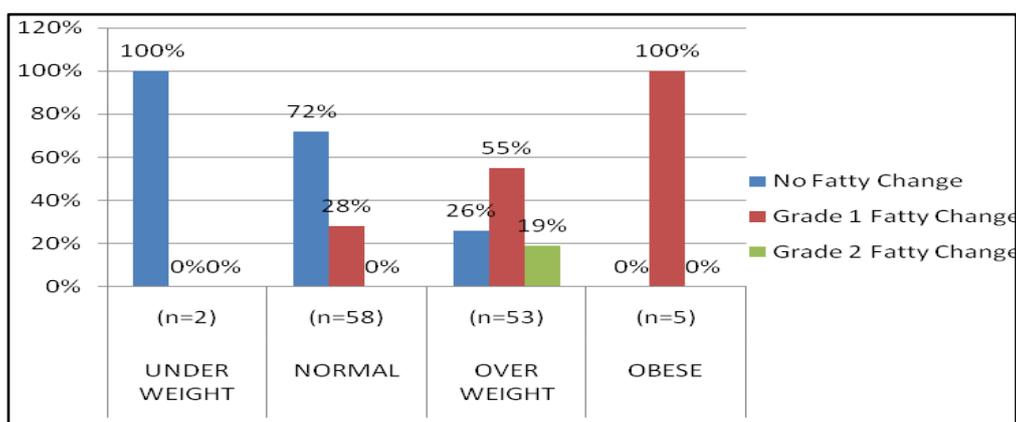
Sex Wise Comparison of Fatty Liver as Assessed by Ultrasonogram- Our study revealed significant number of females, i.e. 43 of 71 females (60%) had fatty liver change compared to males, i.e. 17 of 47 males (36%) had fatty liver change.



Graph 4. Sex Wise Comparison of Fatty Liver by Ultrasonogram

Significant number of females compared to males developed grade 1 or grade 2 fatty liver.

BMI Class Wise Comparison of Fatty Liver by Ultrasonogram- Our study revealed all obese patients showed fatty liver change. Patients who were either overweight (39 of 53) or obese (5 of 5) predominantly showed fatty liver change when compared to normal weight (6 of 48) or underweight (0 of 2).



Graph 5. BMI Class Wise Comparison of Fatty Liver Disease

Significant number of overweight or obese patients developed grade 1 or grade 2 fatty liver disease compared to normal or underweight patients.

DISCUSSION

Since clinical symptoms of fatty liver are nonspecific or silent, this study does not attempt to define the clinical symptoms of fatty liver. Fatty liver most commonly affects middle-aged women with obesity, altered glucose metabolism and hyperlipidaemia.

As reported by Kelly et al,⁴ there was no difference in the mean age of patients with fatty liver as compared to those with normal liver. Our study also showed the same result.

Our study revealed more number of females developed fatty liver disease as compared to males (43 of 71 females had fatty liver disease as compared to 17 of 47 male patients).

Obesity was found to have a significant association with fatty liver. In the study done by Akbar et al⁵ in Saudi Arabia, obesity was identified as an independent risk factor for the development of NAFLD. Our study showed 74% of overweight patients had fatty liver change. All 5 obese diabetics developed fatty liver.

Ruhl CE et al⁶ documented elevation of ALT as the biochemical abnormality in patients with NASH. An AST/ALT ratio >1.0 was yet another finding⁷ in a study on NASH.

Contrary to these studies, a study in 2003 found liver enzymes to be insensitive and unreliable to confirm the diagnosis or stage the extent of fibrosis, older age, obesity and diabetes were shown to be predictive of diabetes.

Our study also did not find significant elevation of any of the liver enzymes in patients with fatty liver. There was no significant difference between the liver enzyme parameters among patients with fatty liver and those without fatty liver. An 85% of patients in this study had AST/ALT ratio more than 1, but it was not found to have any association with fatty liver.

No significant relationship was found between the presence of NAFLD, type of hypoglycaemic drugs used and the duration of diabetes.

CONCLUSION

Non-invasive ultrasonogram of abdomen is the need of the hour for early and wide screening to detect this fatty liver disease in patients with Diabetes. Persons with higher BMI are at greater risk of developing NAFLD.

Our study also showed female persons have greater risk of developing NAFLD. No significant correlation was found between age of the patient, duration of diabetes and NAFLD.

Liver enzymes were thought to be a potential non-invasive strategy for early detection of this disease. But, the present study did not find any correlation between liver enzymes and degree of fatty liver in Indian patients.

So, the conclusion is less expensive non-invasive USG of liver is the ideal diagnostic tool for the early detection and management of fatty liver; especially useful in obese people, females and diabetic patients.

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