ORIGINAL ARTICLE

Relation of Ultrasound Detected Non-Alcoholic Fatty Liver Disease and Dyslipidemia

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ABSTRACT

Background: Non-Alcoholic Fatty Liver Disease **(**NAFLD) has appeared asone of the mostwidespread hepatic disease in the Western nationswhichis now emergent in Asian nations also. NAFLD is escalating in patients with Type-II Diabetes. NAFLD seems to be seen inIndians, Philippinos and Malaysians.It issuggested to be acausativereason for hepatocellular carcinoma. T

Aim: To identifynon-alcoholic fatty liver on ultrasonography and see for an association with serum lipid irregularities.

Methods: 100 cases composed of45 males and 55 females, which were diagnosed with NAFLD on ultrasound examination were further studied with a complete serum lipid profile. Anevaluation of lipid irregularitiesamongstvariouscategories of fatty liver spotted on ultrasound was performed.*P*value was considered by ANOVA test and a *P* value of<0.05 was measured as significant statistically.

Results: From 100 cases, which were confirmed as NAFLD on sonography, patients with grade I disease were 51%, grade II were 33% and grade III were 16%. Mean age of the patients was 45.23. Males were 45 and females were 55 in number. Serum triglycerides, LDL and VLDL levels were raised in 50%, 33%, 32% of the cases respectively. Decreased serum HDL levels were seen in 33% of patients. On analysis, it wasrevealedthat as the grades of NAFLD were increased, meaningfulcorrelationwas seen with increasing values of triglycerides (*P* value-<0.05), LDL (*P* value-<0.05) and VLDL (*P*value-0.022) and low HDL (*P*value-<0.05).

Conclusion: Majority of cases with NAFLD in Pakistan remain undetected. Although liver biopsy remains the gold standard in diagnosing NAFLD, ultrasound examination is an easily available, simple, non-invasive modality for new detection of NAFLD in asymptomatic patients. There seems to be a significant correlation between abnormal serum lipid levels and NAFLD.

Keywords: Dyslipidemia, fatty liver disease, ultrasonography

INTRODUCTION

NAFLD is currently being documented animportant health problem. The occurrence of fatty liver in the Indian subcontinent was reported to be as high as 15%-30%[1], which is comparable to that stated from the western world[2]. Previous studies showed that NAFLD had a benign progression. Lately it has been realized NAFLD can advance to fibrosis, cirrhosis, leading to liver failure and hepatocellular carcinoma[3].

Majority of patients diagnosed with NAFLD are asymptomatic at diagnosis. Hepatomegaly might be theloneclinical presentation in patients[4].Liver biopsy remains an excellent techniquefor the diagnosis of NAFLD. Yet, liver biopsy remains an invasive and painful ordeal[5]. It haspotentialcomplications which include bleeding[6]and errors while sampling[7]. Apart from the fact that there isa growing figure of cases with ultrasound detected NAFLD, the practice of hepatic biopsy remains clinically &monetarilyunfeasible.

To appraise and approve the utility of ultrasoundto get a diagnosis of NAFLD is paramount.The current studiesobjective is to confirm NAFLD non-invasively by sonography and thento relatesonographicallyconfirmed NAFLD with serum lipid profile.

MATERIAL AND METHODS

After taking an informed consent this study was conducted between January 2016 and November 2016, in the Department of Radiology and Medicine, Ghurki Trust Teaching Hospital, Lahore.There were a total of 100 patients out of which 45 were males and 55 females.These patientswere assessedsonographically for fatty liver. Patients of 20 years and above diagnosed withNAFLD by ultrasound were included in the study. Patients with a history of alcohol intake werenot includedin the examination. The sonographic examinations were carried out on Toshiba Xario Prime Ultrasound with

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3.75MHzcurvilinear probe.Grading of non-alcoholic fatty liver on ultrasonography[5] is as follows:
Grade I: Slightlyincrease in theechotexture. Liver presentsas bright compared to the cortex of the kidney (Figure IIA).
Grade II: Moderately diffuse increasedechogenicity of liver with slightdecreased visualization of the intrahepatic vessels. (Figure IIB).
Grade III: Significant increase in the echotexture with poor/ no visualization of intrahepatic vessels and diaphragm along with poor penetration of the posteriorportion of the right hepatic lobe(Figure IIC).
Thecases diagnosed as NAFLD on sonography were also checked for serum lipid profile.Lipid profile was measured by taking fasting blood sample level and processing it in Microlab-300 (semi-automation) machine and was interpreted by qualified technologist.
Statistical analysis: The results were recorded on SPSS 23. Mean values, standard deviation, charts were calculated. P value was calculated by using ANOVA& value <0.05 was considered statistically significant.

RESULTS

From a total of 100 sonographicallydetermined NAFLD cases were counted in the study. Figure I demonstrates the age of the patients. Patients in the third & fourth decade of their lives formed majority of the patients (76%). The ultrasonography results showed NAFLD with grade I in 38%, grade II in 32% and grade III in 16% of the patients included in the study. Serum triglycerides, LDL and VLDL levels were raised in 50%, 33%, 32% of patientscorrespondingly. Decreased serum HDL levels were noticed in 33% of patients.P-value for LDL, VLDL, triglycerides in different grades of NAFLD is shown in Table-I. Noteworthy association was also found between serum triglyceride levels and increasing grades of ultrasonographically diagnosed NAFLD. NAFLD in different age groups is given in Table II

Table I: Chi square test result

Parameter	P-value
LDL	<0.05
VLDL	< 0.022
Triglycerides	< 0.05
Decreasing HDL levels	< 0.05

Fig. I

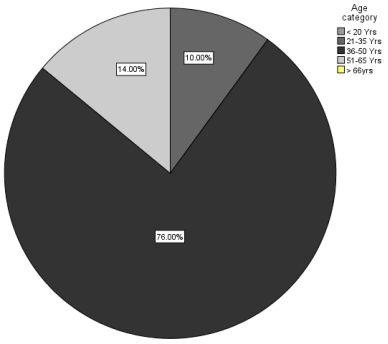

Fig. II: A. Ultrasound abdomen shows Grade-1(mild fatty) disease in 26yrs old patient. B. Grade-II (moderate fatty liver) disease seen in a 30yrs old patient. C. Grade-III (severe fatty liver) seen in a 40yrs old patient.

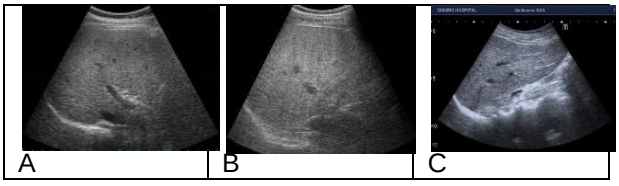

Table II: Age category * Degree of Fatty Change Crosstabulation

Age category	Degree of Fatty Change				Total
	Grade I (Mild fatty)	Grade-II (Moderate fatty)	Grade-III (Severe fatty)	Normal	
21-35 Yrs	6	1	0	3	10
36-50 Yrs	25	29	14	8	76
51-65 Yrs	7	2	2	3	14
Total	38	32	16	14	100

DISCUSSION

Occurrence of NAFLD is increasing in the Asian region. There is an increase in fat in the diet accompanied by minimal physical exercise. A 2.6 timesincrease in occurrence of NAFLD was establishedin association with T2DM[8]. NAFLD can lead to end stage liver disease that includes cirrhosis and has been proposed to culminate in hepatocellular carcinoma[9].Only a few,sonographic based studies have been documented from Pakistan in NAFLD patients.

This study was performed with the aim of diagnosing NAFLD on ultrasound in those patients who were asymptomatic or with vague symptoms like abdominal pain, fatigue, malaise.The age of the patients wasbetween 25 years to 65 years. Only a few studies have documented the mean age of

NAFLD patientsas between 45 -55 years[10]. Patients presenting with NAFLD are mostly asymptomatic[11]. In our study, low HDL was observed in 33% cases. RoliAgrawalsaw low HDL in 45.16% of patients. In our study serum triglycerides, serum HDL, serum LDL and VLDLwere raised in patients with rising grades of NAFLDS suggesting a strong correlation and statistical significance ($P<0.05$)[12].

The accumulation of fat within hepatocytes, typicallyas triglycerides, is a precondition for the change into nonalcoholic fatty liver disease. Insulin resistance remains the most significant factor in the occurrence of nonalcoholic fatty liver disease[13].Liver biopsy remains the gold standard for the diagnosis of NAFLD. But, due to fact of it being an invasive procedure with potential complications of bleeding and sampling errors, it does not remain a feasible diagnostic tool for every asymptomatic patient. For this very reason ultrasonography is a very good means to diagnose NAFLD which is augmented by appreciablyraised lipid profile values observed in our patients.

Ultrasonography can be employed for the early recognition of NAFLD. Ultrasonographically diagnosed NAFLD patients exhibitedsubstantialrelationship with serum lipid profile. Ultrasound remains the most inexpensive modality for perceiving changes correlating with NAFLD and tends to minimize undergoing complex, expensive and dreary investigations in such patients and asymptomatic cases.

CONCLUSION

Using of ultrasonography in the early detection of NAFLD and its associationto the extent of dyslipidemia at various stages of disease progression should assistto grade the liver damage in NAFLD.Liver biopsy can simply be replaced by ultrasonography as it can be life threatening. Complications, which include bleeding and sampling errors can occur. But ultrasonography is easily accessible, non-invasiveand a simple tool. It can be helpful for the early detection of NAFLD in asymptomatic patients also.The routine of ultrasonography is therefore, clinically and monetarily practical for the early diagnosis of patients with NAFLD.Diagnosis of NAFLD and dyslipidemia can help prompt further investigations to diagnose metabolic syndrome commonly accompanying with NAFLD, instigating an early diagnosis, ensued by early treatment.

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