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ORIGINAL ARTICLE

Frequency of Fatty Liver Changes on Ultrasound Abdomen in Non Diabetic Young Patients Having Chronic Right Hypochondrium Pain

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ABSTRACT

With a prevalence of around 20 – 30% in world population, Fatty liver is becoming the most commonly occurring ailment.

Aims: To check the frequency of fatty liver changes on ultrasound abdomen in non diabetic young patients presenting with chronic right hypochondrium pain of more than two weeks duration.

Study Design: Cross-sectional study.

Methodology: Patients (n=375) with an age range of 18 to 50 years presenting to the OPD with complaint of chronic right hypochondrium pain of more than 2 weeks duration were included into the study. Demographic details, Total serum cholesterol mg/dl, triglycerides and LFTs (ALT, AST U/L) were recorded. Patients were sent for ultrasound abdomen for confirmatory diagnosis and findings trained were recorded. All this information was recorded on Performa.

Statistical analysis: Data was analyzed using SPSS version 26. Results were presented as frequency and percentage. Age was presented as mean± SD.

Results: Out of total 375 patients 175 (45.6%) were male and 200 (52.1%) were female. Mean age of the patients was 32.65 ± 6.94 years. 56.5% (n=217) had fatty liver changes on ultrasound. 143 (65.8%) patients had grade I fatty changes, 58 (26.7%) had grade II and 16 (7.4%) had grade III liver disease.

Conclusion: It was concluded that frequency of fatty liver changes detected on ultrasound was high in non diabetic young patients. Liver enzymes (especially ALT) showed an increasing trend as the disease severity increased on ultrasound.

Keywords: LFTs, Chronic, Fatty Liver, Grading and Ultrasound.

INTRODUCTION

With a prevalence of around 20 – 30% in world population, Fatty liver is becoming the most commonly occurring ailment[1]. It is a term which is used to describe a set of liver conditions ranging from simple form of steatosis to steatohepatitis. The pathophysiology behind this widely occurring condition is the accumulation of excess fat in the liver cells due to inability of liver to breakdown and metabolise fat globules[2]. Usually it presents with common symptoms such as abdominal pain and discomfort along with chronic fatigue, without any major symptoms but may silently lead to liver damage in other cases[3].

Major causative factor behind fatty liver changes are the dietry factors (diet rich in fatty substances, over nutrition) and sedentary lifestyle (lack of activity). Various risks factors associated with fatty liver changes have been identified. These include obesity, diet containing high fat content, malnutrition, sudden weight loss, diabetes mellitus and excessive alcohol intake[4]. It is termed as Alcoholic fatty liver when related to the alcohol intake and non alcoholic fatty liver disease (NAFLD) if attributed to other causes.

Non alcoholic fatty liver disease usually manifests itself in four stages[5]. It starts from a simple fatty liver (steatosis) which is usually an incidental finding during routine investigations. Next in line is the non alcoholic steatohepatitis in which slight inflammation of liver is noticed. Persistent inflammation can lead to liver fibrosis. This fibrosis leads to scarring of liver and in turn a more serious condition called cirrhosis. Initial investigations include evaluation of liver function tests (ALT, AST) and ultrasound abdomen. On ultrasound fatty liver appears bright (hyperechoic) with increased thickness of subcutaneous tissue and vascular blurring of hepatic or portal vein[6]. Non alcoholic fatty liver is associated with various common comorbid conditions such as diabetes mellitus type 2, hypertension or metabolic syndrome[7]. Due to its increasing prevalence and debilitating effect on the quality of life of the patients, we designed this study.

Objectives: To check the frequency of fatty liver changes on ultrasound abdomen in non diabetic young patients presenting with chronic right hypochondrium pain of more than two weeks duration**.**

METHODOLOGY

Present study was a cross-sectional study. Informed consent was taken from the patients or guardians prior to enrolling the patients into the study. Patients with an age range of 18 to 50 years presenting to the OPD with complaint of chronic right hypochondrium pain of more than 2 weeks duration were included into the study. Patients with diabetes mellitus, hypertension, liver cirrhosis, carcinoma liver were excluded from the study. Venous blood samples of all the patients after 12 hours of fasting were sent to laboratory for Total serum cholesterol mg/dl, triglycerides and LFTs (ALT, AST U/L). Patients were sent for ultrasound abdomen for confirmatory diagnosis and findings trained were recorded. Fatty liver will be labelled when following parameters will be met ie brightness of parenchyma, well defined gall bladder wall, liver to kidney contrast, attenuation of waves and bright vessel walls. Patients having fatty liver changes will be labelled as cases and those without changes would be labelled as controls for analytical purposes. Fatty liver grading was carried out into grade 1(mild), grade 2 (moderate) and grade 3 (marked)[8,9]. All this information was recorded on Performa.

Statistical Analysis: Data was analyzed using SPSS version 26.0. Mean and SD was calculated for variables such as age. Percentage and Frequency was calculated for variables (categorical) such as gender and patients having fatty liver changes. Data Normality was assessed using Shapiro wilk test, which showed a parametric distribution of data. LFTs (ALT, AST), triglycerides and Total serum cholesterol levels were compared between the patients having fatty liver changes (cases) and those without fatty liver findings (controls) using independent samples T test. One way ANOVA will be used to compare AST, ALT and total serum cholesterol among various grades of fatty liver. P-value of ≤0.05 was considered to be significant.

RESULTS

Out of total 375 patients 175 (45.6%) were male and 200 (52.1%) were female. Mean age of the patients was 32.65 ± 6.94 years. Age range of the patients was 18 – 47 years. 56.5% (n=217) had fatty liver changes on ultrasound where as 41.1% (n=158) had normal liver architecture with no fatty liver changes. 143 (65.8%) patients had grade I fatty changes, 58 (26.7%) had grade II and 16 (7.4%) had grade III liver disease.

Comparison of total serum cholesterol, triglycerides ALT and AST among patients having fatty liver changes (cases) and those without fatty liver changes (controls) showed a statistically significant difference among both groups ($p < 0.5$) as shown in Table-1. Along with ultrasound changes biochemical parameters were also seen to be raised in these patients.

Table 1: Comparison of LFTs and Lipid profile among patients with and without fatty liver changes.

Parameter	Cases (n=217)	Control (n=158)	p value
Total serum cholesterol mg/dl	265.51 ± 54.68	109.01 ± 24.22	0.001*
Triglycerides mmol/L	2.47 ± 0.52	0.91 ± 0.39	0.001*
ALT U/L	87.01 ± 16.3	32.32 ± 8.12	0.001*
AST U/L	64.11 ± 10.84	27.17 ± 7.35	0.001*

*Statistically significant

Comparison of the above mentioned parameters among various grades of fatty liver change also yielded a statistically significant difference ($p < 0.5$) as shown in Table-2.

Table 2: Comparison of biochemical Parameters among Grades of fatty liver changes

Parameters	Grade I	Grade II	Grade III	P-value
Total serum cholesterol mg/dl	235.11 ±22.11	307.93 ± 40.36	383.50 ± 40 .23	0.001*
Triglycerides mmol/L	2.20 ± 0.26	2.86 ± 0.46	3.48 ± 0.39	0.001*
ALT U/L	81.62 ±12.15	91.37 ±14.90	119.37 ± 11.51	0.001*
AST U/L	63.65 ± 10.36	63.08 ± 10.85	71.87 ±12.63	0.001*

*Statistically significant.

Post Hoc tukeys test for multiple comparison revealed the following results as shown in Table-3.

Table 3: Post Hoc Tukeys test for intergroup comparison

Parameter	Grade I vs Grade II	Grade I vs Grade III	Grade II vs Grade III
Total serum cholesterol	.001	.001	0.001
Triglycerides	.001	.001	.001
ALT	.001	.001	.001
AST	.98	.006	.006

DISCUSSION

Frequency of fatty liver changes on ultrasound was alarmingly high (56.5%) in our study in young non diabetic patients. Elizabeth et al studied the prevalence of NAFLD in obese children and reported that out of 408 children 26% children had fatty liver changes. 29.4%were male and 22.6% were females[10]. Abbas et al in his study has labelled NAFLD as a real threat in Pakistan with a prevalence of 15% in general population[11]. Amna et al in their research paper found NAFLD in 60.8% of the study population. Higher prevalence was found in patients with poor glycemic control, dyslipidemia and increasing BMI[12].Mostly the patients were found to have grade I changes. This suggests that early diagnosis and management can prevent further deterioration and progression to liver cirrhosis and hepatocellular carcinoma. Mahaling et al revealed similar results with grade I NAFLD most prevalent (47.15%), followed by grade II (42.8%) and grade III (10%)[13].

Biochemical parameters derangement can be detected early and may be suggestive of underlying structural abnormalities. Total serum cholesterol and triglyceride levels were significantly raised in patients having fatty liver disease. There was an increasing trend seen in these parameters as the disease severity increased. In our study ALT levels showed a similar trend however AST levels showed statistically insignificant difference in grade I and grade II changes. However as the disease progressed from the early stages and patients enter the grade III severity, AST levels changed significantly. Persistently elevated levels of ALT have been identified as a predictor of histological progression towards liver cirrhosis. Similar results were given in a study conducted by Mahaling et al with serum triglycerides and total serum cholesterol raised in the cases as compared to control[13]. Ghanaei et al reported similar findings in which Liver enzymes (ALT, AST, ALP, GGT) and lipid profile (serum cholesterol, triglycerides, HDL) were significantly raised in patients with NAFLD[14].

Pardhe et al showed an increasing levels of liver enzymes and serum triglycerides as the disease severity increased as the disease progressed from grade I to grade III[15]. Namoos et al assessed the biochemical changes associated with NAFLD in Pakistani population and revealed a statistically significant increase in the liver enzymes in such patients as compared to control group ($p=0.001$)[16]. Tanwani et al showed a significant correlation of triglycerides with grades of fatty liver. However, lipid profile was not significantly different among various grades of NAFLD[17]. Iqbal et al in his study on 2007 patients found 436 (21.72%) positive NAFLD cases. He further suggested that the most common cause of raised liver enzymes is NAFLD[18].

NAFLD is correlated with various other metabolic conditions such as hypertension, cardiovascular diseases, diabetes mellitus etc. Management of risk factors by weight reduction, glycemic control and medication to treat dyslipidemia is the main goal in prevention from NAFLD. There is a dire need to conduct large population based surveys to understand the risks and increase awareness in developing a healthy life style among masses in order to save them from this life threatening and silently progressing condition.

Limitations: Our study had limitations like financial constraints, lack of resources, genetic workup and short duration of study.

CONCLUSION

It was concluded that frequency of fatty liver changes detected on ultrasound was high in non diabetic young patients presenting with chronic right hypochondrium pain. Biochemical derangments (Total serum cholesterol, triglycerides ALT, AST) were also significantly altered in patients showing abnormalities in liver Architecture. Liver enzymes (especially ALT) showed an increasing trend as the disease severity increased on ultrasound.

Authors' Contribution: SAAG&NKN: Conceptualized the study, analyzed the data, and formulated the initial draft.

SHT&IR: Contributed to the proof reading.

RS,MUR&TL: Collected data.

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