ORIGINAL RESEARCH

Fatty liver disease evaluation with USG and CT scan

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Received Date:26 May 2022 Accepted Date:17 June 2022

ABSTRACT

Background: Hepatic steatosis (HS), another name for fatty liver disease (FLD), is characterized by an abnormal accumulation of lipids, especially triglycerides, in the cytoplasm of hepatocytes. The present study was conducted to assess fatty liver disease using USG and CT scan.

Materials & Methods:106 cases of fatty liver disease of both genders were selected and ultrasound (USG) and CT scans were taken.

Results: Out of 106 patients, 60 were males and 46 were females.FLD grading was grade I in 62, grade II in 28 and grade III in 16 patients. The difference was significant (P< 0.05). Liver CTHFN mean HU in grade I was 45.1 HU, in grade II was 26.4 HU and in grade III was 3.7 HU. The difference was significant (P< 0.05).

Conclusion: Findings from USG and CT scans were both useful in diagnosing fatty liver disease.

Key words: CT scan, Fatty liver disease, USG

Introduction

Hepatic steatosis (HS), another name for fatty liver disease (FLD), is characterized by an abnormal accumulation of lipids, especially triglycerides, in the cytoplasm of hepatocytes. The frequency of FLD in the general population in Asia varies from 12 to 24%, with the majority of estimates falling between 6 and 14%.[1] NAFLD encompasses a range of liver conditions, including cirrhosis, non-alcoholic steatohepatitis (NASH), and steatosis. Based on the percentage of fat-laden hepatocytes identified by light microscopy, NAFLD is defined by the American Association for the Study of Liver Diseases as fat buildup in the liver that exceeds 5% to 10% by weight. NAFLD-related steatosis is usually macrovesicular as opposed to microvesicular.[2]

Depending on definition and detection techniques, the prevalence of NAFLD in developed nations like the US and Australia is thought to be around 30% of people. Though formerly believed to be at low risk, NAFLD is also growing more prevalent in Asia; in China, a prevalence of up to 15% has been documented.[3]Unusual LFT findings are the most frequent way that NAFLD manifests. Raised gamma glutamyl transferase (GGT), elevated ALT and AST, with a preserved ALT:AST ratio of 1.5, and, on occasion, elevated alkaline phosphatase (ALP) are typical findings in non-alcoholic fatty liver disease (NAFLD).[4] By assessing liver attenuation/Computer Tomographic Hounsfield numbers (CTHFN), which are represented in Hounsfield Units (HU), Computed Tomography (CT) can quantitatively indicate liver fat content. Reliable hepatic attenuation of 30% liver fat content.[5]The present study was conducted to assess fatty liver disease using USG and CT scan.

Materials & Methods

The present study comprised of 106 cases of fatty liver disease of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. They were all inspected in detail. Patients in the supine and left lateral decubitus positions were scanned using ultrasound (USG) at both centers using a Toshiba Xario with a 3.5MHZ probe. Grade 0-normal echogenicity, Grade I-mild diffuse rise in echogenicity, Grade II-moderate diffuse increase in echogenicity, and Grade III-noticeable increase in echogenicity were the classifications used to assess the severity of FLD. Additionally, patients underwent CT scans using a Siemens 64-slice dual-source scanner. In the supine position, patients were scanned. An unenhanced CT scan with a section thickness of 5 mm, 80-140 kV, and 100-300 mAs was conducted. To assess the CTHFN of liver attenuation values, areas of interest (ROIs) between 50 and 100 mm2 were randomly selected. Results were of the study was

assessed. P value less than 0.05 was considered significant.

Results

Table: I Distribution of patients

Total- 106		
Gender	**Males**	**Females**
Number	60	46

Table I shows that out of 106 patients, 60 were males and 46 were females.

Table: II USG grading of fatty liver disease

Grading	Number	P value
Grade I	62	0.05
Grade II	28	
Grade III	16	

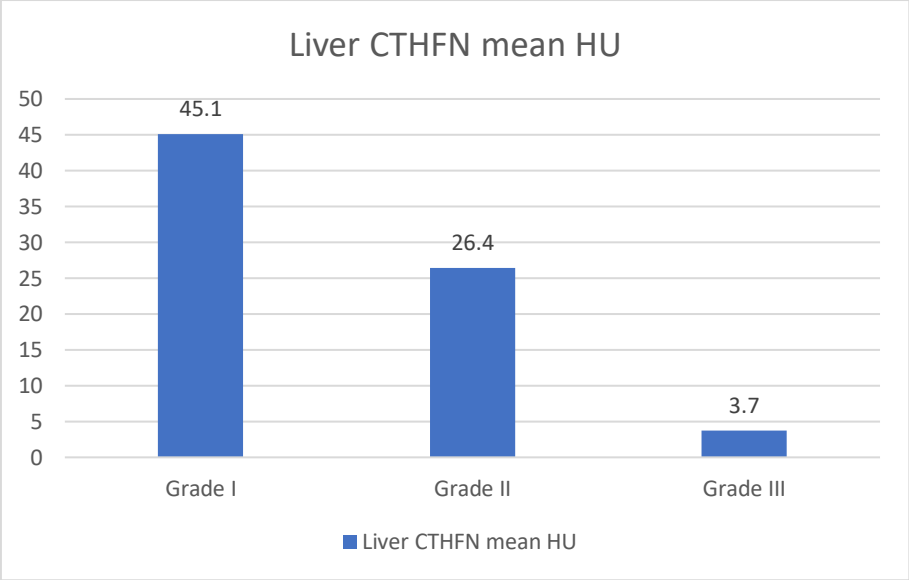
Table II shows that FLD grading was grade I in 62, grade II in 28 and grade III in 16 patients. The difference was significant (P< 0.05).

Table: III Mean values of liver computer tomographic Hounsfield numbers in USG categories of FLD

Grading	Liver CTHFN mean HU	P value
Grade I	45.1	0.05
Grade II	26.4	
Grade III	3.7	

Table III, graph I shows that liver CTHFN mean HU in grade I was 45.1 HU, in grade II was 26.4 HU and in grade III was 3.7 HU. The difference was significant (P< 0.05).

Graph: I Mean values of liver computer tomographic Hounsfield numbers in USG categories of FLD



Discussion

Three things are necessary for a conclusive diagnosis of nonalcoholic fatty liver disease (NAFLD): fatty infiltration confirmed by imaging (ultrasound, magnetic resonance imaging [MRI]) or histology (liver biopsy); significant alcohol consumption ruled out; and other causes of hepatic steatosis (e.g., medications, surgery, metabolic disorders) ruled out. Using ultrasonography to confirm hepatic fatty infiltration is crucial.[6] Ultrasound has a high specificity (95%) but a low sensitivity (85%) for identifying fatty infiltration. Although ultrasound has a sensitivity of approximately 43–74% (specificity is slightly greater at 54–89%), it is also helpful in detecting cirrhosis symptoms such an uneven liver edge.[7] Important indicators of cirrhosis problems include portal hypertension (splenomegaly, enlarged portal vein, varices), as well as additional complications including ascites, HCC, or portal vein thrombosis.[8] These results are frequently observed

when metabolic syndrome symptoms are present. Before the symptoms of portal hypertension and decompensation become evident, a number of physical and laboratory findings, such as spider naevi, low or declining platelets, low albumin, or a reversal in the ALT:AST ratio (where AST exceeds ALT), should arouse suspicion of cirrhosis.[9]The present study was conducted to assess fatty liver disease using USG and CT scan.

We found that out of 106 patients, 60 were males and 46 were females.Males had a higher prevalence of FLD than females, according to Boyce et al.[10] They discovered that 51.5%, 40.4%, and 8.6% of patients in grades I, II, and III had FLD, respectively. The degree of FLD can be objectively measured by CT. It estimates the amount of liver fat using attenuation measurements. An increase in intrahepatic fat content results in a decrease in liver attenuation. Numerous investigations have demonstrated that when the severity of FLD increases, CTHFN decreases. CTHFN (attenuation) levels in the unenhanced normal liver parenchyma range from 50 to 65HU, usually 8–10HU higher than liver. For the detection of liver steatosis, unenhanced CT has a sensitivity of 43–95% and a specificity of 90–100%.

We found that FLD grading was grade I in 62, grade II in 28 and grade III in 16 patients. In a meta-analysis of 49 studies, Hernaez R et al.[11] found that USG had a sensitivity of 84.8% and a specificity of 93.6% for the identification of moderate-to-severe FLD, respectively, when compared to histology, the gold standard. Recent research comparing USG and histopathology has demonstrated that it is a useful non-invasive method for assessing FLD and that Grades 0 or 1 do not necessitate biopsy.

We found that liver CTHFN mean HU in grade I was 45.1 HU, in grade II was 26.4 HU and in grade III was 3.7 HU. 227 FLD patients who had both abdominal CT and USG scans and an ultrasound diagnosis of diffuse FLD were included by Eifler et al.[12] The mean Liver CTHFN was compared to the USG categories of FLD. The population's average age was 49.88 ± 14.52 years. There were 141 (62.11%) males and 86 (33.89%) females in the population. There were 159 (70.04%), 50 (22.03%), and 18 (7.93%) patients with mild, moderate, and severe FLD, respectively. According to USG, the mean liver CTHFN values for mild, moderate, and severe FLD were 42.08 ± 5.07 HU, 24.41 ± 4.19 HU, and 3.09 ± 6.64 HU, respectively. P values and the 95% CI are included with these values. The Least Significant Difference (LSD) between USG categories of FLD in repeated comparison. When mild FLD was compared to moderate and severe FLD, moderate FLD with mild and severe FLD, and severe FLD with mild and moderate FLD, the Least Significant Difference (LSD) of USG categories of FLD with mean Liver CTHFN was significant in multiple comparison.

Conclusion

Authors found that findings from USG and CT scans were both useful in diagnosing fatty liver disease.

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