

Relationship between Hypertension and Aorta Arch Calcification on Chest X-Ray Photos of Ischemic Stroke Patients at The General Hospital Haji Adam Malik Medan 2022

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ABSTRACT

Introduction: Fatty liver is a broad term for a condition in which there is an increase triglyceride level in hepatocyte. In Indonesia there is not much research about this condition. Fatty liver is a major health problem in West countries, and is slowly increasing in Asian countries. For many individual with fatty liver, have no specific complaint or can have no symptoms at all. The aim of this study was to analyzed the relationship between fatty liver images on abdominal CT scans with dyslipidemia.

Method: This study is an observational analytic study with a case – control type of research with the aim of knowing the relationship between CT scan images of fatty liver and dsylipidemia. The data in this study were all medical records who went to the Radiology Department for abdominal CT Scan at the Haji Adam Malik General Hospital for a period of one year from January 1st, 2020 to December 31st 2020.

Results: The subjects on the abdominal CT scan results with fatty liver and high triglyceride is 5 peoples out of 12 (41.7%). The test results obtained p value = 0.,688 (p>0,05), in other words there is no significant relationship between fatty liver and high triglyceride level.

Conclusion: No significant relationship was found between the incidence of fatty liver and the incidence of dyslipidemia.

Fatty liver, Computed tomography, Dyslipidemia

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INTRODUCTION

The liver is said to be “fatty” if the hepatocytes contain more than 5% triglycerides. The diagnosis of fatty liver is confirmed by liver biopsy, which can differentiate between mild (5% - 33%), moderate (>33% and <66%) and severe (>66%).[1] Hepatic steatosis or “Fatty liver”, is also said to be a term widely used for conditions with elevated triglycerides in the cytoplasm of hepatocytes, with altered hepatocellular lipid metabolism. Hepatic steatosis is a growing health concern in industrialized countries, with increasing prevalence despite growing awareness in recent years.[2,3] In Indonesia, there is still lack of research about fatty liver.[4]

The prevalence in Asian countries, especially in the Asian - Pacific region is also a major problem of public health that needs to be considered. In Asian countries that have been carried out research can match the incidence with Western countries.[5] Prasetya et al reported 186 patients with type 2 diabetes mellitus (DM), at Cipto Mangunkusumo General Hospital, Jakarta in 2017 as many as 86 patients (45.2%) had NAFLD, and 17 patients (25.0%) had severe fibrosis.[6]

A lipid profile is a blood test that measures levels of total cholesterol, triglycerides, HDL cholesterol, and LDL cholesterol. Abnormality of one of the lipid profiles in plasma is called dyslipidemia. Many studies

have shown that non alcoholic fatty liver disease (NAFLD) is closely related to metabolic diseases, such as obesity, type 2 diabetes and dyslipidemia. Dyslipidemia can be classified based on primary dyslipidemia caused by genetics and most often in children, and secondary dyslipidemia, which is caused by lifestyle and most often in adults.[7]

The incidence of this fatty liver in one study conducted by Giorgio et al, the incidence of fatty liver was 2/1000 individuals, but by the same method in another study conducted by Ratziu et al, the rate increased by 49% in obese individuals, and in In a study conducted by Vernon et al, the increase in fatty liver continued to increase in a follow-up study of 3147 patients in whom there was no risk of fatty liver, as much as 10% after 414 days of follow-up showed fatty liver.[8]

The lack of data available in Indonesia especially in North Sumatra regarding this fatty liver subject, and its complications that can lead to conditions such as cirrhosis, their relation to metabolic syndrome disease and even lead to malignancy. People whose affected by this disease are mostly asymptomatic, which making people unaware of this disease and its complication, therefore it is important that this research was conducted.

METHOD

This study was conducted observationally with a cross sectional approach which aims to analyze the presence of fatty liver on abdominal CT scan with an increase in lipid profile, especially triglycerides at Haji Adam Malik General Hospital, Medan. Data collection has obtained permission from the Ethics Committee for the Implementation of Health Research, Faculty of Medicine, University of North Sumatra and the Director of Human Resources, Education and General Affairs, Haji Adam Malik General Hospital, Medan.

The data in this study were all medical records who went to the Radiology Department for abdominal CT Scan at the Haji Adam Malik General Hospital for a period of one year from January 1st, 2020 to December 31st 2020. Inclusion criteria included the age of the subject over 18 years old (male and female). Has the result of abdominal CT Scan without contrast and lipid profile. While the exclusion criteria patient who went undergone splenectomy and abdominal CT Scan with an artefact hampering for evaluation. The total sample in this study were 25 people. An analysis result is said to be statistically significant if the p value <0.05 is obtained.

After obtaining approval from the research ethics commission, the data were recorded whether there was fatty liver followed by lipid profile examination. The process of CT Scanning without contrast, was performed using standard protocol 16 – slice MDCT Scanner (GE Bright Speed 16) and CT Philips Ingenuity Core 128. For this examination, using four criteria proposed previously in the literature were applied to evaluate for fatty liver: (i) liver HU less than 48, (ii) hepatic attenuation index – the ratio of liver to spleen HU – less than 0.8, (iii) HU difference between liver and spleen of less than 10, and (iv) hepatic vessel HU greater than or equal to hepatic parenchyma HU. The diffuse fatty liver pattern were chose, because it is the most common pattern of the fatty liver. Fatty liver attenuation evaluated by the researcher and one radiologist at Haji Adam Malik General Hospital, Medan.

RESULT

Data from this study was 25 people who had abdominal CT Scan at Radiology Department in Haji Adam Malik General Hospital, also had lipid profile and met the inclusion criteria. Table 1 shows the demographics of research subjects.

Table 1 Characteristic of Subjects Demographics

Characteristics	Frequency	Percentage
Gender		
Male	16	64.0
Female	9	36.0
Total	25	100

In table 1, the subject on this study, shown male subjects have the largest percentage of 16 people (64%).

Table 2 Characteristic of Subjects Age

Characteristics	Frequency	Percentage
Age		
18 -50 y.o	8	32
> 50 y.o	17	68
Total	25	100

In table 2, most of the patient age is >50 years, as many of 17 people (68.0%), the youngest subject is 27 years old and the oldest age being 75 years old.

Table 3 Relationships of Subjects Abdominal CT Scan with Cholesterol

Cholesterol	CT Scan				Total	P value*
	Fatty liver	Non fatty liver				
Normal	5	29.4%	12	70.6%	17	100.0%
High	4	50.0%	4	50.0%	8	100.0%
Total	9	36.0%	16	64.0%	25	100.0%

* Chi Square

From tabel 3 shown, after evaluation with chi square test, the subject on the CT scan results 9 peoples (36,0%) with fatty liver, of which 5 peoples (29,4%) with high cholesterol dan 4 peoples (50%) with normal cholesterol resuting $p = 0,394$ ($p > 0.05$), indicates there is no significant relationship with the presence of a fatty liver on CT scan with an increase in cholesterol.

Table 4 Relationships of Subjects Abdominal CT Scan with Triglycerides

Triglycerides	CT Scan				Total	P value*
	Fatty liver	Non fatty liver				
Normal	4	29.4%	9	70.6%	17	100.0%
High	5	41.7%	7	58.3%	12	100.0%
Total	9	36.0%	16	64.0%	25	100.0%

* Chi Square

After analyzing with chi - square test in table 4, resulted total of 9 subjects who had fatty liver with normal triglycerides as many as 4 people (29.4%) and 5 people (41.7%) with high triglyceride values. The obtained p value = 0.688, indicating that there is also no significant relationship between fatty liver on abdominal CT scan and triglyceride levels.

Table 5 Relationships of Subjects Abdominal CT Scan with HDL

HDL	CT can				Total	P value*
	Fatty liver	Non fatty liver				
Normal	7	36.8%	12	63.2%	19	100.0%
High	2	33.3%	4	66.7%	6	100.0%
Total	9	36.0%	16	64.0%	25	100.0%

* Chi Square

In table 5, after the chi - square test, the results obtained were total of 9 subject of which 7 subjects (36.8%) with normal HDL and 2 subjects (33.3%) with elevated HDL. The results of the analysis obtained p value = 1,000. Indicates that on the abdominal CT scan of fatty liver there is no relationship with HDL values.

Table 6 Relationships of Subjects Abdominal CT Scan with LDL

LDL	CT Scan				Total	P value*
	Fatty liver		Non fatty liver			
Normal	5	36.8%	8	63.2%	13	100.0%
High	4	33.3%	8	66.7%	12	100.0%
Total	9	36.0%	16	64.0%	25	100.0%

*Chi square

The same results shown in table 6, total of 9 people with fatty liver, where 5 people (36.8%) with normal LDL and 4 people (33.3%) with high LDL. The test resulting in p value = 1,000. Shows that there is no significant relationship between CT scan of fatty liver and LDL levels.

DISCUSSION

In this study, the number of male patients with fatty liver was higher than that of female patients. Research conducted by Chen et al. stated that in men is an independent risk factor for the occurrence of NAFLD. In this study, the higher incidence in men was due to an association with a more likely accumulation of visceral fat and an association between subcutaneous adipose tissue and insulin resistance. Estrogen is thought to suppress the accumulation of visceral fat and increase the accumulation of subcutaneous fat.[9]

With increasing age, especially in the age group above 50 years, the occurrence of fatty liver will also increase due to increased risk factors in old age such as metabolic syndrome, obesity, diabetes mellitus, and dyslipidemia. In addition, elderly patients are also more likely to have advanced fibrosis, cirrhosis, and hepatocellular carcinoma.[10] The prevalence of NAFLD increases with age, in the year age group of 20-40 years about 18%, in the year age group 40-50 years around 39% and > 40 % increases of risk factor in the age group of 70 years.[11]

There have been several epidemiological studies on fatty liver in the individual over 70 years, the first study being conducted in Israel, which recruited 91 inpatients from 3 rehabilitation hospitals, and the subsequent study was conducted in a British clinic, recruiting 351 outpatients. In a study conducted in Israel, Kagansky et al, used ultrasound and CT scan as diagnostic modalities for NAFLD, while Frith et al used liver biopsy. Both studies found a prevalence of NAFLD exceed 40% in individuals 70 years of age or older. However, Frith et al. study found a high prevalence of fibrosis (40%) and cirrhosis (14%) with biopsies of these elderly individuals in contrast to the study of Kagansky et al, which no signs of chronic liver disease were found on physical examination of the patients. The weakness of the Kagansky study was that it relied too much on clinical examination to detect advanced liver disease, which had low sensitivity especially in the absence of decompensated cirrhosis.[12]

There is a strong association between fatty liver and dyslipidemia, in a study conducted by Ma et al. conducted a multivariate analysis on 949 retired elderly workers and reported that triglyceride and HbA1c results are independent markers of NAFLD. Approximately 20-80% of patients with NAFLD also have dyslipidemia.[13] In a study conducted by Han et al in Korea in 2019, stated that subjects with fatty liver had a higher risk of developing dyslipidemia compared to subjects without fatty liver. Subjects with fatty liver had a 2.4 times risk of developing dyslipidemia compared to those without fatty liver. This study has similar results to previous studies conducted by Targher et al and Chatrath et al, that patients with fatty liver are characterized by increased triglyceride and LDL levels and decreased HDL levels.[14]

Obesity is one of the major health problems worldwide, and is indicated as a risk factor that plays a major role in the occurrence of metabolic disorders. A study conducted by Ganjooei et al, analyzed the lipid profile of 90 morbidly obese patients with a body mass index above 40 kg/m², and reported, 60% of the patients had histologically proven to have fatty liver. The mean level of total cholesterol in patients with fatty liver had a significantly higher value than patients without fatty liver. The majority of obese patients in the study of Ganjooei et al showed a dyslipidemic profile. NAFLD is increasingly being shown to be a

multifactorial disease associated with genetic, metabolic disorders including obesity, dyslipidemia, insulin resistance and cardiovascular disease.[15]

In a study conducted by Li et al, compared the clinical characteristics of obese patient and non-obese patients with the incidence of NAFLD. As has been known previously that NAFLD often occurs in obese individuals, but there are also individuals with a normal body mass index who can suffer from NAFLD. Due to the normal body mass index, if there is NAFLD in the individual it will be very hard to identified. The results of this study showed that the incidence of NAFLD was higher in the obese group compared to those without obesity.[16] Kwon et al reported study from general health check in 29.994 subjects, that the prevalence of NAFLD in the non-obese group (BMI <25 kg/m²) was found to be around 12.6% at the time of the study. In studies that have been reported, NAFLD patients who are thin, usually male predominant, relatively young, have high hemoglobin levels, and low blood pressure.[17]

The weakness of this study is that there is no etiology that can distinguish between fatty liver including the absence of comorbid data, body mass index and severity in the research subjects. In this study there is no statistically significant relationships between fatty liver in abdominal CT scans with an increased lipid profile in research subjects.

CONCLUSION

The highest proportion of samples based on gender, as many as 16 people (64%) were male. The highest age of patients with fatty liver in this study was the sample group aged over 50 years. There is no significant relationship between the appearance of fatty liver on abdominal CT scan with lipid profile in these research subject. Suggestion for the next study with addition of its etiology and body mass index from the research subjects.

DECLARATIONS

Ethics approval and consent to participate. Permission for this study was obtained from the Ethics Committee of Universitas Sumatera Utara and Haji Adam Malik General Hospital.

CONSENT FOR PUBLICATION

The Authors agree to publication in Journal of Society Medicine.

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COMPETING INTERESTS

The authors declare that there is no conflict of interest.

AUTHORS' CONTRIBUTIONS

All authors significantly contribute to the work reported, whether in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas. Contribute to drafting, revising, or critically reviewing the article. Approved the final version to be published, agreed on the journal to be submitted, and agreed to be accountable for all aspects of the work.

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