ISSN: 0975-3583, 0976-2833 VOL8, ISSUE2, 2017

Original Article

To estimate the Liver Enzymes in Metabolic Syndrome patients with and without NAFLD

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Abstract

Background & Methods: The aim of the study is to estimate the Liver Enzymes in Metabolic Syndrome patients with and without NAFLD. 'Demographic data' like age, sex, Body Mass Index (BMI), of all the participants were recorded for the study.

Results: The liver enzymes of MetS patients. MetS with NAFLD had ALT range 19-298 U/L, median value 57.1 U/L and median value 45.8 U/L and interquartal range 36 U/L, 72.5 U/L, median value 125.7 U/L and interquartal range 99.5 U/L, 156.5 U/L, median value 393.2 U/L and interquartal range 32 U/L, 45 U/L.

Conclusion: Our findings indicate that there is an increased incidence of all MetS features as well as significant alterations in liver enzymes in NAFLD patients. As a result, anytime metabolic components are determined, patients should be recommended to have their lipid profile and liver function tests performed to determine the presence of NAFLD.

Keywords: liver, enzymes, metabolic & NAFLD.

Study Design: Observational Study.

Introduction

Non-alcoholic fatty liver disease, component of 'metabolic syndrome' (MetS), is one of the prime cause of 'chronic liver disease'. Nearly half of NAFLD patients fit the metabolic syndrome criteria[1]. NAFLD promotes metabolic disorders such as hyperglycemia, hyperuricaemia, hyperlipemia, and hypertension, which result in metabolic consequences such as 'cardiovascular disease' (CVD), 'coronary artery disease' (CAD) and 'Type-2 Diabetes Mellitus', all of which have extremely unfavorable prognosis.

NAFLD is a clinical syndrome which is characterized by excessive lipid storage in hepatocytes and presence of hepatic steatosis without significant intake of alcohol. All over the world, it has been accepted as the most frequently seen chronic liver disease[2].

Insulin resistance (IR), hypertension, atherogenic dyslipidemia, & central obesity are among the metabolic disorders together referred to as metabolic syndrome. These disorders are

ISSN: 0975-3583, 0976-2833 VOL8, ISSUE2, 2017

significantly accompanied with an elevated risk of producing of non-atherosclerotic & atherosclerotic cardiovascular disease (CVD) and diabetes mellitus[3].

The identification of 'NAFLD', which can be determined by histology, imaging, or biomarkers, as well as the presence of at least one overweight or obese feature, 'Type 2 Diabetes Mellitus' or metabolic derangements are the principal constituents for the diagnosis of MAFLD. Increased abdominal obesity, hypertriglyceridemia, hypertension, low HDL-C, insulin resistance, pre-diabetes and inflammation and/or subclinical inflammation are among at least two characteristics that satisfy the final requirement[4-6].

Every year approximately 3.6 million patients are being diagnosed with NAFLD and its incidence is seen to be increasing rapidly based on its widespread existence of upto 25%. Between 15 and 40 percent of people in western nations and between 9 and 40 percent of people in Asian nations have NAFLD overall.

Cardiovascular disease (CVD) & Diabetes Mellitus are two main causes of increased mortality & morbidity within South Asian nations including India and where the frequency of 'metabolic syndrome' & obesity is arising quickly[7]. The Metabolic Syndrome has been found in around one-third of South Asian urbanites.

Material and Methods

Research was conducted in Department of Biochemistry, for 01 Year at Index Medical College Hospital & Research Centre, Indore in collaboration of Department of General Medicine. Samples were analyzed for biochemical investigations. Sample was comprised 200 MetS patients (100 with NAFLD & 100 without NAFLD) of both sexes in 20 to 60 years aged range. The patients of metabolic syndrome & diagnosed cases of NAFLD were taken. We were obtained written consent form from all the participants before enrolling them for the study.

Group A - Composed of 100 clinically diagnosed cases of MetS without Non-Alcoholic Fatty Liver Disease.

Group B - Composed of 100 clinically diagnosed cases of MetS with Non-Alcoholic Fatty Liver Disease.

INCLUSION CRITERIA

1. Clinically diagnosed Metabolic Syndrome patients according to the NCEP ATP III Criteria

2. Clinically diagnosed NAFLD patients by Ultrasonography report

3. Patients of both gender, aged between 20-60 years

4. Patients who were willing to participate in the study were taken.

EXCLUSION CRITERIA

1. Alcoholic

2. Smokers

3. Patients with known thyroid disorders

ISSN: 0975-3583, 0976-2833 VOL8, ISSUE2, 2017

4. Patients with history of drug abuse or history of psychiatric disorder

5. Patients with cancer or suspicion of malignancy

6. Lactating or pregnant women were also excluded from study.

Result

Table 1: Gender wise frequency distribution of Metabolic Syndrome (MetS) patients

Gender	MetS with NAFLD		MetS without NAFLD	
	No.	%	No.	%
Male	61	61	53	53
Female	39	39	47	47

Our study included adult MetS patients with and without NAFLD. Each group comprises 100 participants aged 20 to 60 years. MetS with NAFLD comprised males (61%) and females (39%), while MetS without NAFLD comprised males (53%) and females (47%).

Table 2: BMI wise frequency distribution of Metabolic Syndrome patients

Gender	MetS with NAFLD		MetS without NAFLD	
	No.	%	No.	%
Underweight (<18.5)	00	00	00	00
Normal (18.5 24.9) 15	06	06	08	08
Overweight (25 29.9)	35	35	43	43
Obesity (≥30)	59	59	49	49

The MetS patients were classified on the basis of BMI. BMI was normal in 06% patients and Prevalence of overweight and obesity was 35% & 59% respectively in case of MetS with NAFLD. Among MetS without NAFLD, 08%, 43% & 49% patients were in normal, overweight and obese group respectively.

Table 3: Fasting blood glucose wise frequency distribution of Metabolic Syndrome patients

Gender	MetS with NAFLD		MetS without NAFLD	
	No.	%	No.	%
50 -100	13	13	28	28
101 -150	55	55	53	53
151 -200	21	21	14	14
201 -250	03	03	04	04
>250	08	08	01	01

ISSN: 0975-3583, 0976-2833 VOL8, ISSUE2, 2017

Table 4: Liver enzyme in Metabolic Syndrome patients

Groups	Liver Enzymes	Median
MetS with NAFLD	ALT (U/L)	57.1 (48-93.5)
	AST (U/L)	45.8 (36-72.5)
	ALP (U/L)	125.7 (99.5-156.5)
	GGT (U/L)	39.2 (32-45)
MetS without NAFLD	ALT (U/L)	40.5 (30-60)
	AST (U/L)	31.5 (25-61.75)
	ALP (U/L)	95.2 (78.3-109)
	GGT (U/L)	29.3 (23-36)

The liver enzymes of MetS patients. MetS with NAFLD had ALT range 19-298 U/L, median value 57.1 U/L and median value 45.8 U/L and interquartal range 36 U/L, 72.5 U/L, median value 125.7 U/L and interquartal range 99.5 U/L, 156.5 U/L, median value 393.2 U/L and interquartal range 32 U/L, 45 U/L.

Discussion

Studies conducted in Asian population report a prevalence of MetS is ranging from 11.11% to 25.8%177. According to Chen SH et al, Prevalence of NAFLD among patients with, and without MetS was found to be 62.78% and 12.97% respectively178 and according to Kumar SKK et al it was 86.25% and 65.91% respectively179[8].

Prevalence of metabolic syndrome among patients 60.43% male & 39.56% female in with NAFLD and 52.17% male & 47.82% female in without NAFLD were found in our study. This percentage of MetS is higher in male compare to females. Similar results were found byAmarapurkar-et-al180 discovered that in India, more males (24.6%) than females (13.6%) had NAFLD, while Patel H et al found that males (42%) had a greater prevalence of NAFLD than females (22%)181[9].

In contrast, Alvina found in her study found (31.1%) males and (68.9%) females in 90 persons182 and De Lusong et al.183 reported that 71% female and 29% male are accounted NAFLD patients within 134 patients. Kalra S et al also reported that NAFLD is seen more frequently in females than males110.

Out of the various factors used as diagnostic criteria of “metabolic syndrome” only waist circumference was significantly related to phenomenon of NAFLD. Additionally, body weight and BMI are other factors that were significantly correlated with NAFLD[10-12]. Therefore, Body weight, Waist circumference, and BMI are significant association with NAFLD. Our study results showed that obesity, especially abdominal obesity is a chief anticipate in progression of NAFLD which is in compliance with previous results192,193.

So even without any invasive blood investigations subjects with higher BMI, body weight and waist circumference can be considered as at higher risk of underlying NAFLD. Among the

ISSN: 0975-3583, 0976-2833 VOL8, ISSUE2, 2017

metabolic parameters studied only lipid profile and liver enzymes (ALT, AST, ALP & GGT) were having significant differences between the groups with and without NAFLD.

Conclusion

Our findings indicate that there is an increased incidence of all MetS features as well as significant alterations in liver enzymes in NAFLD patients. As a result, anytime metabolic components are determined, patients should be recommended to have their lipid profile and liver function tests performed to determine the presence of NAFLD.

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