



## Study of Patients with Non Alcoholic Fatty Liver Disease and its Association with Metabolic Syndrome in tertiary centre

Authors

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### Abstract

*NAFLD Nonalcoholic fatty liver disease (NAFLD) is emerging as an important cause of liver disease in India. NAFLD includes patient with simple steatosis, as also those with non alcoholic steatohepatitis (NASH). NASH is more advanced stage of NAFLD and has a higher risk of progressing to liver cirrhosis or hepato cellular carcinoma<sup>[1]</sup>. NAFLD frequently associated with metabolic syndrome, obesity, Type-2 diabetes mellitus and hyper lipidaemia are co-existing conditions frequently associated with NAFLD. Because of the strong association with various metabolic abnormalitites, NAFLD is now considered as a part of spectrum of metabolic syndrome. the present study is aimed to evaluate the clinical, biochemical profile in patients of NAFLD with varying degree of severity as diagnosed by ultrasonography and evaluate the association between the non-alcoholic fatty liver disease and the metabolic syndrome and its individual components as defined by the NCEP ATP III criteria.*

**Results:** 51% of patients with NAFLD had metabolic syndrome and statistically significance was found in AST, waist circumference, lipid profile total cholesterol was significantly higher in grade III NAFLD which was significantly higher. AST ALT values were significantly higher among grade III NAFLD Cases (p value <0.001, <0.001 respectively).

### Introduction

Non alcoholic fatty liver disease is most common liver disease since its prevalence is estimated to be 20% to 30% in general population of western countries<sup>1</sup>. NAFLD occurs as a histological spectrum of disease and it include the subtypes of simple steatosis and non alcoholic steatohepatitis (NASH). NASH that is characterized by hepatic steatosis, liver cell injury, hepatic inflammation, fibrosis, necrosis is believed to be an intermediate stage of NAFLD<sup>2</sup>. It was thought to be an benign condition but is now increasingly recognized as a

measure cause of liver related morbidity and mortality. Studies introduced that NAFLD may progress to liver failure, cirrhosis and HCC (hepatocellular carcinoma)<sup>1</sup>. Available data from clinical, experimental & epidemiological indicates that NAFLD may be the hepatic manifestation of metabolic syndrome<sup>4</sup>.

In 2001 the NCEP ATP III introduced simple clinical criteria which was widely adapted since they are simple to use in clinical practice and since a large number of studies evaluated their reliability<sup>5</sup>.

In 2005 the American heart association (AHA) and the national lung heart and blood institute updated the ATP III criteria with minor modifications. Thus, the metabolic syndrome is defined by presence of three or more of the following components<sup>6</sup>:

- Abdominal obesity (waist circumference >102cm in men and >88cm in women).
- Elevated triglycerides (>150mg/dl or on drug treatment for elevated triglycerides).
- Reduced HDL-C level (<40mg/dl in men and <50mg/dl in women or on drug treatment for reduced HDL-C.)
- Hypertension (SBP >130mmhg or DBP >85mmhg or on antihypertensive drug treatment).
- Impaired fasting glucose (100-125mg/dl or on antidiabetic drug treatment.)

The frequent association of non alcoholic fatty liver disease with individual component of the metabolic syndrome is now well known. However it is unknown whether the risk for this disease is increased in patients with metabolic syndrome. This is important because the metabolic syndrome is an emerging problem worldwide and its prevalence is likely increasing.

This work was design to study the clinical profile of patients of non alcoholic fatty liver disease with varying degree of severity as diagnosed by ultrasonography and evaluate the relationship between NAFLD and metabolic syndrome along with its components as defined by the modified NCEP ATP III criteria.

### Material and methods

**Ethics-** The study was approved by the ethical committee of N.S.C.B. MCH Jabalpur. Patients was enrolled in study after written informed consent.

The study was an observational study of patients suspected as NAFLD attending OPD, and patients admitted in department of medicine NSCB Medical college, Jabalpur (M.P.)

### Inclusion criteria

- All patients diagnosed as NAFLD by abdominal ultrasonography.
- Age >18years.

### Exclusion criteria

- Patients <18 year or >85year of age.
- Patients with history of alcohol intake >30gm /day in males &> 20gm /day in females.
- Patient with history of jaundice or HbsAg/anti HCV positive.
- Thyroid disorders
- Patients with history of following drug intake -steroids, synthetic estrogens, heap-rin, calcium channel blockers, amiodarone, valproic acid, antiviral agents.<sup>7</sup>

Subjects were included in the study according to the standard criteria accepted by the American gastroenterology association i.e. an increase in hepatic echogenicity as a reference, had showed a prevalence of 24.5%. The presence of enhancement and lack of differentiation in the periportal intensity and the vascular wall due to great hyper echogenicity in the parenchyma<sup>8</sup>. There are three grades of fatty liver according to ultrasonographic finding:-

**Grade I-** Slight diffuse increase in the fine echoes liver appears bright as compared to the cortex of kidney. Normal visualization of diaphragm and intrahepatic vessel borders.

**Grade II-** moderate diffuse increase in the fine echoes slightly impaired visualization of intrahepatic vessels and diaphragm.

**Grade III-** marked increase in the fine echoes. poor or no visualization of intrahepatic vessel borders ,diaphragm and the vessel.

### Results

In our study out of 100 cases 68%, 28%, 5% cases are of grade I, grade II and grade III fatty liver respectively. mean age is 47.07±11.95 in yrs. maximum no. of patients were in 4<sup>th</sup>& 5<sup>th</sup> decades and male to female ratio was 5:4. According to BMI 25% of patient were overweight, 61% were obese out of which 46% were moderately obese and 15% were severely obese (BMI >30).

**Table 1:** Comparison of variables in patients of NAFLD, with and without metabolic syndrome

	Metabolic syndrome Present			Metabolic syndrome Absent		
	NAFLD Grade		USG	NAFLD Grade		USG
	1	2	3	1	2	3
Abdominal pain	14	11	3	19	7	1
Fatigue	22	13	3	27	7	1
dyspepsia	16	8	2	17	4	1
Malaise	6	4	1	7	3	0
Hepatomegaly	2	3	1	7	3	0
AST (IU/L) [ > 37]	13	15	4	18	5	1
ALT (IU/L) >40	13	15	4	20	6	1
high Waist circumference	24	12	2	12	1	0
Diabetics	13	9	3	7	2	0
Hypertension	12	4	4	6	3	0
Low HDL	27	16	3	20	4	1
Triglyceride (mg/dl) [ >150]	20	16	3	15	5	1

**Table 2:-**Clinical and biochemical profile of all cases of NAFLD

Variable	Mean	± Std. Deviation
Age (yrs)	47.07	11.95
SBP (mmHg)	126.99	17.62
DBP (mmHg)	80.36	8.47
Hb (gm/dl)	12.050	1.77
Total count (in cc)	6623.349	7889.20
Fasting Sugar (mg/dl)	113.18	48.82
PP sugar (mg/dl)	193.83	94.60
Serum Bilirubin (mg/dl)	.936	0.34
ALT (IU/dl)	57.51	52.10
AST (IU/dl)	46.48	27.30
Total Cholesterol (mg/dl)	201.69	46.87
Triglyceride (mg/dl)	178.09	83.48
HDL (mg/dl)	41.56	7.45
LDL (mg/dl)	119.66	31.11
VLDL (mg/dl)	30.496	10.33

**Table 3** Comparison of variables of NCEP ATP III criteria in patients of NAFLD with metabolic syndrome and NAFLD without metabolic syndrome.

Variables	NAFLD with Metabolic syndrome		NAFLD without Metabolic syndrome		p value
	Mean	± S D	Mean	± S D	
Fasting Sugar(mg/dl)	128.18	59.31	97.57	27.62	<b>0.001</b>
SBP in (mmHg)	130.94	17.32	122.88	17.14	<b>0.021</b>
DBP (mmHg)	82.43	8.12	78.20	8.36	<b>0.012</b>
Triglyceride (mg/dl)	195.29	95.72	160.19	64.73	<b>0.035</b>
HDL (mg/dl)	39.12	5.91	44.10	8.07	<b>0.001</b>
Waist circumference (cm)	91.90	9.16	81.94	9.31	<b>&lt;0.001</b>

**Discussion**

In this study 100 subjects with NAFLD were included out of which 51(51%) of NAFLD cases had metabolic syndrome according to NCEP ATP III Criteria using Asian indian standards for waist circumference, Which was similar to studies of Ajay Duseja et. al (50%)&Deepa Uchida et. al (47%)<sup>(9,10)</sup>

Out of 51 patients 31(60.7%), 20 (39.2%) were female and male respectively ,but statistically was not significant when compared to NAFLD cases not having metabolic syndrome. 67% were female in a study conducted by Ajay Duseja et al.<sup>9</sup> Mean age group of those having metabolic syndrome was 47.07±11.9 which is higher by a decade to that reported by Bajaj.et al (40.11+1.1)<sup>9</sup> 38% of those having metabolic syndrome had increased waist circumference (male >90cm, Female >80cm.) which was statistically significant. 58.7% and 47.1% of cases had increased waist circumference as reported by Bajaj et al and Ajay Duseja et al respectively.

Hypercholesterolemia was seen in 46.4% of patients, hypertriglyceridemia seen in 83.48% patients. 95.7%of NAFLD with metabolic syndrome had Hypertriglyceridemia. In study of Bajaj et al and deepauchil et al reported 23.1 &43.6%of patients with metabolic syndrome had hypercholesterolemia and hypertriglyceridemia In our study the p value for hypercholesterolemia and Hypertriglyceridemia in grade III NAFLD

Cases was  $<0.001$ ,  $<0.006$  which was significantly higher.

Derranged AST ( $57.1 \pm 52.10$ ) and ALT ( $40.48 \pm 27.30$ ) was found in greater % of patients of NAFLD with metabolic syndrome than those without metabolic syndrome with (p value  $<0.001$ ,  $<0.001$ ) respectively. Means NAFLD patients may have more NASH like and severe disease

### Conclusion

Non alcoholic fatty liver is the object of significant scientific clinical interest which is going to increase in following years. Epidemiological studies demonstrate that NAFLD and metabolic syndrome are emerging as major problems of public health. Our study also reveals that there is higher prevalence of all the components of metabolic syndrome in cases of NAFLD. Therefore whenever these parameters are encountered in the clinical setting, patients must be evaluated for the presence of NAFLD by abdominal ultrasonography.

Early detection would help not only in modifying the disease course and delaying its complications but would also play a major role in preventive cardiology.

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**Statement of Interests:** None

### Reference

1. Bedogni G, Miglioli L, Masutti F, Trilabeli C, Merchesini G, Bellentani S, prevalence and risk factor for non alcoholic fatty liver disease : the Dionysis nutrition and liver study. *Hepatology* . 2005july;42(1):44-52
2. Angulo P. Non alcoholic fatty liver disease *N Engl J Med*. 2002apr18; 346(16):1221-31
3. Adams LA, Lymp JF, St Sauver J et al the natural history of nonalcoholic fatty liver disease: a population based cohort study. *Gastroenterology* 2005(Jul);129(1):113-121
4. Marchesini G, Brizi M, Bianchi G et al. non alcoholic fatty liver disease a feature of the metabolic syndrome. *diabetes* 2001Aug ; 50 (8): 1844-1850.
5. Third report of the National Cholesterol Education Programme (NCEP) Expert panel on Detection Evaluation and Treatment of High Blood Cholesterol in Adults (Adults Treatment panel III) final report *circulation*. 2002 Dec17 106(25):3143-421.
6. Grundy SM, Cleeman JI, Daniels SR, et al. Diagnosis and management of the metabolic syndrome : An American Heart association / National Heart , Lung and blood institute scientific statement , *circulation* 2005oct 25 : 112(17) : 2735-52
7. Sanyal AJ . AGA Technical review on non alcoholic fatty liver disease *Gastroenterology* 2002 ; 123 : 1705-25.
8. Roti Agrawal , sunita Mishra , VK Dixit & Sweta Rai. Association of non alcoholic fatty liver disorder with obesity . *Indian J Prev Soc med*. 2008 ; 39 : 13-16.
9. Duseja Ajay, Das Ashim , Das Reena, Dhiman RK, Chawla Y, Bhansali A, Kalra Naveen. The clinicopathological profile of indian patients with non alcoholic fatty liver disease (NAFLD) is different from that in the west. *Dig dis Sci* 2007 Sep;52(9):2368-2374.
10. Uchida Deepa, Pipalia D, Chawla M, Patel R, Mani arsonali, Narayani Juneja Archana. Non-Alcoholic fatty liver disease (NAFLD)- The Hepatic component of Metabolic syndrome. *J Assoc Physicians india* 2009;57:201-204.
11. Nomura H, Kashiwagi S, Hayashi , et al. Prevalence of fatty liver in the general population of Okinawa, Japan. *Japanese Journal of Medicine* 1998; 27: 142-149.
12. Singh SP, Nayak S , Swarn M , et al. Prevalence of NAFLD in eastern coastal India-A Preliminary USG study. *Tropical Gastroenterology* 2004; 2: 76 – 79.