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Original Research Paper

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STUDY OF CLINICAL PROFILE OF PATIENTS OF NON ALCOHOLIC FATTY LIVER DISEASE AND ITS ASSOCIATION WITH METABOLIC SYNDROME

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ABSTRACT

Background : Non-alcoholic fatty liver disease (NAFLD) is considered as the commonest liver problem in the western world and is increasingly being recognised as a major cause of liver-related morbidity and mortality. It is known to be associated with various metabolic abnormalities, but not much information is known regarding association between the metabolic disease and the severity of fatty liver.

Aims : To study the clinical profile of patients of NAFLD as diagnosed by ultrasonography and to study the correlation between the non-alcoholic fatty liver disease and metabolic syndrome along with its individual components.

Material and Methods : The study was an observational study of patients diagnosed as NAFLD, attending OPD and indoor patients of the Department of Medicine, , SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , CHENNAI. All patients diagnosed with NAFLD were investigated for metabolic syndrome according to the NCEP ATP 3 Criteria and a relationship between NAFLD and metabolic syndrome was studied.

Results : 51.4% of patients of NAFLD had metabolic syndrome and statistical significance was found with AST, diabetes mellitus and lipid profile.

Conclusions : Higher prevalence of all components of metabolic syndrome in cases of NAFLD. Early detection can help in modifying the disease course, delaying complications.

KEYWORDS : Non alcoholic fatty liver disease , Metabolic syndrome

INTRODUCTION:

Non-alcoholic fatty liver disease (NAFLD), is considered to be the commonest liver problem in western world affecting 15-40% of the general population[1]. Non-alcoholic fatty liver disease is increasingly now being recognised as a major cause of liver-related morbidity and mortality.[24] , Because of its ability to progress to liver failure and cirrhosis.

The pathological picture of non-alcoholic fatty liver disease, ranges from simple steatosis to steatohepatitis, advanced fibrosis and cirrhosis, resembles that of alcoholic liver disease, but this also occurs in patients who do not consume alcohol.[4] Nonalcoholic steatohepatitis is characterised by hepatic steatosis, liver cell injury, hepatic inflammation, fibrosis and necrosis is found to be an intermediate stage of non-alcoholic fatty liver disease.2

It has been suggested that fatty liver disease can be an hepatic consequence of metabolic syndrome or a cluster of metabolic disorders. This disease is often associated with Type 2 diabetes mellitus, Hypertension , obesity and dyslipidaemia. Each of these abnormalities carries cardiovascular disease risk and together they are often categorised as insulin resistance syndrome or the metabolic syndrome.[5]-[9]

The third report of the national cholesterol education programme expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III [ATP III]) recommends the use of 5 variables for diagnosing metabolic syndrome, namely waist circumference, serum triglyceride level, serum high-density lipoprotein (HDL) cholesterol level, blood pressure, and fasting plasma glucose level.[10]

As metabolic syndrome is an emerging problem worldwide and its prevalence is likely increasing .It is unknown whether the risk of NAFLD is increased with metabolic syndrome.This work was done to study the clinical profile of patients of NAFLD with varying degrees of severity diagnosed by ultrasonography and evaluate the cross-sectional relationship between the non-alcoholic fatty liver disease and the metabolic syndrome along with the individual components, as defined by the modified NCEP ATP III criteria.

MATERIAL & METHODS

The study was an observational study of patients suspected to have NAFLD,attending OPD and in-patients of the Department of Medicine, SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , CHENNAI.

INCLUSION CRITERIA

- Age more than 18 years.
- Patients diagnosed with NAFLD by abdominal ultrasonography

EXCLUSION CRITERIA

- Patients age less than 18 years and more than 85 years.
- Patients with history of HBsAg positive or jaundice.
- Patients with history of intake of hepato toxic drugs like - steroids, synthetic oestrogens, heparin, calcium channel blockers, amiodarone, valproic acid, antiviral agents.[3]
- Patients with history of alcohol intake

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, Presence of enhancement and lack of differentiation in the periportal intensity and the vascular wall due to hyperechogenicity in the parenchyma.[11]

Grade 1: Slight diffuse increase in fine echoes. Liver appearing bright as compared to the cortex of the kidney. Normal visualisation of diaphragm and intrahepatic vessel borders.

Grade 2: Moderate diffuse increase in fine echoes. Slightly impaired visualisation of intrahepatic vessels and diaphragm.

Grade 3: Marked increase in fine echoes. Poor or no visualisation of intrahepatic vessel borders, diaphragm and vessels.

Detailed history, anthropometry and clinical examination were carried out after taking informed consent of the patient.

LABORATORY TESTS

All patients in our study underwent routine investigations including

complete blood counts, blood sugars, liver function tests, HBsAg, anti HCV, and lipid profile. All patients diagnosed with NAFLD were investigated for metabolic syndrome according to the NCEP ATP III CRITERIA10 and a relationship between NAFLD and metabolic syndrome was correlated.

Metabolic syndrome was diagnosed as per NCEP ATP 3 criteria (three or more of the following)

1. Elevated waist circumference (asian indian criteria)12
a.Men- greater than 90 cm
b. Women — greater than 80 cm

2. Elevated triglycerides: greater than 150 mg/dL

3. Reduced HDL cholesterol:
a.Men—Less than 40 mg/dL
b. Women — Less than 50 mg/dL

4. Elevated blood pressure: greater than or equal to 130/85 mm Hg or use of medication for hypertension

5. Elevated fasting glucose: greater than or equal to 100 mg/dL (5.6 mmol/L) or use of medication for hyperglycaemia.

RESULTS

A Total of 70 cases, ultrasonographically diagnosed as NAFLD were included in the study , showed 47.15%, 42.85% and 10% of cases had grade I, II, and III fatty liver respectively.

Mean age in males was 49.10 years while in females it was 49.50 years. Maximum number of patients were in 4 th and 5th decades ,Male : Female ratio was 3:4. 24 out of 70 patients were asymptomatic while 46 were symptomatic. Abdominal pain and fatigue was present in 55.71% and 52.85% patients respectively.

Based on BMI, 22(31.42%) patients were over weight, 32 (45.7%) patients were obese, out of which 24 (34.38%) were moderately obese and 8(11.42%) were severely obese (BMI ≥ 30). 41 (58.57%) patients had increased waist circumference, and 60% patients of NAFLD with metabolic syndrome had grade II fatty liver . 25 (35.72%) of total patients were hypertensive. Percentage of hypertensive patients increased as grade of NAFLD increased in patients with metabolic syndrome i.e. 15.15%, 23.34% and 71.42% in grade I,II and III respectively .23(32.86%) of total patients were diabetics, majority of grade III fatty liver patients had diabetes i.e. 4(57.14%) while 12 (40%) of grade II and 7(21.21%) of grade I patients were diabetics. Impaired fasting glucose was found in 45.71% of patients. 71.42% patient of grade III fatty liver had impaired fasting glucose . ALT and AST levels were elevated in 80% and 61.42% of patients and ALT/AST ratio was > 1.0 in all the patients.

Hypercholestrolaemia was seen in 45.71% patients., Hypertriglyceridaemia was seen in 67.14% patients. 86.1% patients of fatty liver with metabolic syndrome had hypertriglyceridaemia and 85.71% patients of grade III fatty liver with metabolic syndrome had hypertriglyceridaemia. Low serum HDL level were seen in 94.44% patients (Table 1). Increased serum LDL levels were seen in 34.28% patients. Increased serum VLDL levels were seen in 25.71%

Table 1

VARIABLES	NAFLD with Metabolic syndrome (N=36%) N(%)	NAFLD without Metabolic syndrome (N=34%) N(%)	P value
Waist circumference M>90cms , F>80cms	28(77.77%)	13(38.23%)	0.0009
Fasting plasma glucose >100mg/dl	23(63.8%)	10(25.64%)	0.0001
Hypertension >130/85mmHg	17(47.2%)	8(23.5%)	0.034
Triglycerides >150mg/dl	31(86.1%)	16(47.0%)	0.0005
HDL, male - <40mg/dl Female <50mg/dl	34(94.44%)	16(47.05%)	0.000019

DISCUSSION :

NAFLD is known to be associated with various metabolic abnormalities including central obesity, type 2 diabetes mellitus, dyslipidaemia, and hypertension which are all well established cardio vascular risk factors. Liver ultrasonography is frequently used to assess fatty infiltration of the liver, but there is little information on the association between the metabolic disease and the severity of fatty liver (as detected by ultrasound).

51.4% (36) of NAFLD cases had metabolic syndrome according to the NCEP ATP III modified criteria using asian indian standards for waist circumference. Ajay Duseja et al (50%) and Deepa Uchil et al (47.1%) have had similar findings.13,14

Majority of patients (61.1%) having metabolic syndrome had grade II NAFLD whereas in those without metabolic syndrome majority (73.5%) had grade I fatty liver. 6 cases out of 7 having grade III fatty liver had metabolic syndrome.

The mean age group of those having metabolic syndrome was 49.67 ± 9.30 which is higher by a decade to that reported by Bajaj et al (40.11 ± 1.1).15

Out of the 36 patients, 22(61.1%) were females and 14(38.9%) were males but was not statistically significant when compared to NAFLD cases not having metabolic syndrome. 67% were females in a study conducted by Ajay Duseja et al.13

50% of grade II and 57.14% of grade III fatty liver who were symptomatic belonged to those have metabolic syndrome as compared to only 16.67% and 14.28% of grade II and grade III respectively who were in the group not having metabolic syndrome suggesting that patients with metabolic syndrome were more likely to be symptomatic.

Similarly deranged ALT and AST was observed in greater percentages in patients of NAFLD with metabolic syndrome than those without metabolic syndrome. 85.71% of grade III who had deranged ALT and AST had metabolic syndrome. 70% and 60 % (ALT and AST) who had grade II fatty liver had metabolic syndrome (Table 3). 28(77.77%) of those having metabolic syndrome had increased waist circumference (male > 90cms, female > 80 cms) with a mean of 90.27 ± 8.13 cms and this observation was statistically significant (Table 2). 58.7% and 47.1% of cases had increased waist circumference as reported by Bajaj et al and Ajay Duseja et al respectively.13,15 Central obesity was found in 60% and 57.14% patients of grade II and III fatty liver respectively who also had metabolic syndrome.

Type 2 diabetes mellitus is a major component of metabolic syndrome and is associated with both obesity and NAFLD. Diabetes is not only associated with NAFLD but may also be a risk factor for development of progressive fibrosis. Mean fasting plasma glucose (mg/dl) of patients with NAFLD and metabolic syndrome was 127.89 ± 53.57 mg/dl (Table 4). 17(47.2%) were having diabetes (> 126 mg/dl) as compared to 9% described by Kaushal et al in those having metabolic syndrome. 16 23(63.8%) cases had impaired fasting glucose (>100 mg/dl) and was found to be statistically significant when compared to NAFLD without metabolic syndrome.

72.4% and 28% patients had impaired fasting glucose as reported by Ajay Duseja et al and Bajaj et al respectively.13,15 Impaired fasting glucose found in 46.67% and 71.42% of grade II and III fatty liver respectively had metabolic syndrome which was higher than that found in cases without metabolic syndrome.

17(47.2%) patients had blood pressure ≥ 130/85 mm Hg with a mean of 131.33 ± 14.30/84.89 ± 7.50 mm Hg which was similar to that reported by Bajaj et al (48.72%).15 Comparison of the mean values between the groups with and without NAFLD was insignificant. Hypertension found in 23.34% and 71.42% of grade II and III fatty liver respectively had metabolic syndrome.

In patients of NAFLD with metabolic syndrome 31(86.1%) had hypertriglyceridemia (>150 mg/dl) with a mean of 225.47 ± 112.07 which is significantly higher than those reported by Bajaj et al (23.1%) and Deepa Uchil et al (43.6%).14,15 Hypertriglyceridemia found in 63.34% and 85.71% cases of grade II and III fatty liver respectively had metabolic syndrome.

34(94.4%) patients had low HDL levels (< 40 mg/dl in males and < 50 mg/dl in females) with a mean of 39.81 ± 5.19 mg/dl as compared to 66.7% described by Bajaj et al.15 Low HDL levels found in 63.34% and 85.71% of grade II and III fatty liver respectively had metabolic syndrome.

CONCLUSION

From the above observations it is inferred that a clinician should have a high index of suspicion in order to detect NAFLD early in the course of the disease as symptoms and signs of NAFLD are non specific and occurs later in the course of the disease.

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 should be evaluated for the presence of NAFLD by abdominal ultrasonography. Early detection would help in modifying the disease course and delaying its complications.

REFERENCES

1. Farrell GC, Larter CZ. Nonalcoholic Fatty Liver Disease: from Steatosis to cirrhosis. Hepatology 2006;43:S00-S112.
2. Angulo P. Nonalcoholic fatty liver disease. N Engl J Med 2002;346:1221-31.
3. Sanyal AJ. AGA technical review on nonalcoholic fatty liver disease. Gastroenterology 2002;123:1705-25.
4. Neuschwander-Tetri BA, Caldwell SH. Nonalcoholic steatohepatitis: summary of an AASLD Single Topic Conference. Hepatology 2003;37:1202-19.
5. Cortez-Pinto H, Camilo ME, Baptista A, De Oliveira AG, De Moura MC. Non-alcoholic fatty liver: another feature of the metabolic syndrome? Clin Nutr 1999;18:353-358.
6. Marceau P, Biron S, Hould FS, Marceau S, Simard S, Thung SN, Kral JG. Liver pathology and the metabolic syndrome X in severe obesity. J Clin Endocrinol Metab 1999; 84: 1513-1517.
7. Pagano G, Pacini G, Musso G, Gambino R, Mecca F, Depetris N, Cassader M, David E, Cavallo-Perin P, Rizzetto M. Nonalcoholic steatohepatitis, insulin resistance and metabolic syndrome: further evidence for an etiologic association. Hepatology 2002;35:367-372.
8. Marchesini G, Forlani G. NASH: from liver diseases to metabolic disorders and back to clinical hepatology. Hepatology 2002;35:497-49.
9. Angelico F, Del Ben M, Conti R, Francioso S, Feole K, Maccioni D, Antonini TM, Alessandri C. Non-alcoholic fatty liver syndrome: a hepatic consequence of common metabolic diseases. J Gastroenterol Hepatol 2003;18:588-594.
10. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of The Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, And Treatment of High Blood Cholesterol In Adults (Adult Treatment Panel III). JAMA 2001;285:2486-97.
11. 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.
12. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS, Chadha D, Joshi SR, Sadikot S, Gupta R, Gulati S, Munjal YP; Concensus Group. Consensus statement for diagnosis of obesity, abdominal obesity and the metabolic syndrome for Asian Indians and recommendations for physical activity, medical and surgical management. J Assoc Physicians India 2009;57:163-70.
13. Duseja Ajay, Das Ashim, Das Reena, Dhiman RK, Chawla Y, Bhansali A, Kalra Naveen. The Clinicopathological Profile of Indian Patients with Nonalcoholic Fatty Liver Disease (NAFLD) is Different from that in theWest. Dig Dis Sci 2007;52:2368–2374.
14. Uchil Deepa, Pipalia D, Chawla M, Patel R, Maniar Sonali, Narayani, Juneja Archana. Non-Alcoholic Fatty Liver Disease (NAFLD) —The Hepatic Component of Metabolic Syndrome. J Assoc Physicians India 2009;57:201-204.
15. Bajaj S, Nigam P, Luthra A, Pandey RM, Kondal D, Bhatt SP, Wasir JS, Misra A. A case-control study on insulin resistance, metabolic co-variates & prediction score in non-alcoholic fatty liver disease. Indian J Med Res 2009;129:285-292.
16. Madan Kaushal, Batra Yogesh, Gupta S Datta, Chander Bal, Rajan KD Anand, Tewatia MS, Panda SK, Acharya SK. Non-alcoholic fatty liver disease may not be a severe disease at presentation among Asian Indians. World J Gastroenterol 2006;12:3400-3405.