

Research Article

Correlation of non alcoholic fatty liver disease in patients of coronary artery disease

Khwaja Saifullah Zafar^{1*}, N. A. Wafai¹, S. F. Haque²

¹Department of Medicine, UPRIMS & R, Saifai, Etawah, UP, India

²Department of Medicine, JNMC, AMU, Aligarh, UP, India

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*Correspondence:

Dr. Khwaja Saifullah Zafar,

E-mail: khwaja97@gmail.com

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ABSTRACT

Background: In NAFLD, increase in factor VIII and a reduction of protein C leads to the progression from steatosis to cirrhosis. The aim was to study the correlation of NAFLD with other associated risk factors of CAD.

Methods: A total number of 100 patients of coronary artery disease were assessed for presence of NAFLD, dyslipidemia, metabolic syndrome & diabetes by various laboratory tests.

Results: 46% of the CAD patients were found to have NAFLD. 69.6% patients of NAFLD were in the age group of 40-60 years. 21.7% were above 60 years. 91.1% of NAFLD patients were males. Half of the NAFLD patients were diabetic. 21.7% of NAFLD patients were found to have a total cholesterol level >200. Triglyceride level was also high among these patients (58.7%). All the NAFLD patients had LDL <100. 52.2% of them had metabolic syndrome.

Conclusions: The study showed a direct correlation between NAFLD & CAD. Metabolic syndrome, diabetes, increased total cholesterol & triglyceride level were also associated with increased risk for CAD. However LDL level was not found to be associated with NAFLD risk.

Keywords: Coronary artery disease, Fatty liver, Non-alcoholic risk factor

INTRODUCTION

In 1980, Ludwig & colleagues coined the term 'Non Alcoholic Steatohepatitis' to describe a form of liver disease observed in middle age patients with abnormal liver biochemical results & histologic evidence of alcoholic hepatitis but no history of alcohol abuse.¹ NASH is believed to be a part of the spectrum of Non Alcoholic Fatty Liver Disease (NAFLD) which includes fatty liver, NASH & NAFLD associated cirrhosis.

In NAFLD, increase in factor VIII and a reduction of protein C leads to the progression from steatosis to cirrhosis.² This imbalance may play a role in the risk for cardiovascular disease and liver fibrosis, which are associated with NAFLD.³ It is diagnosed when fatty infiltration affects more than 5% of hepatocytes in the

presence of less than 20 gm of alcohol intake per day without evidence of other causes of liver disease.⁴ Prevalence of NAFLD varies according to the population studied & diagnostic criteria used.⁵ Asian studies reported NASH and NAFLD occurring at lower body mass index (BMI).⁶⁻⁸

Most important risk factor for NAFLD is insulin resistance. Other major risk factors include obesity, metabolic syndrome, type 2 DM, dyslipidaemia, starvation, Kwashiorker & Marasmus. Minor risk factors include cytotoxic drugs, metals and inborn errors of metabolism, extensive small bowel resection, inflammatory bowel disease & severe anaemia.⁵

Ischemic heart disease is the generic designation for a group of pathophysiologically related syndromes

resulting from myocardial ischaemia. Atherosclerotic plaque obstructing the coronary artery is the most important cause (coronary artery disease) of IHD.⁹

Risk factors of IHD include non modifiable & modifiable factors. Non modifiable factors are age, sex, family history, genetic factors & type A personality. Modifiable factors are hypertension, smoking, dyslipidaemia, diabetes, obesity, sedentary lifestyle & stress.¹⁰⁻¹³

METHODS

Study design

Prospective study over a period of 2 years.

Study group

100 patients attending the OPD of Medicine department.

Inclusion criteria

All the patients of CAD above 20 years.

Exclusion criteria

Alcohol intake >20 gm/day, Chronic liver disease (CLD) patients, presence of HBsAg or HCV antibody, patients exposed to cytotoxic drugs & toxic metals.

Method of study

Detailed history and physical examination was done from all cases selected for the study. Laboratory investigations were done. USG abdomen was done to detect fatty changes in the liver.

Statistical analysis

Descriptive analysis of the collected data was done & association of various parameters with presence or absence of NAFLD was studied using T test, chi square test & correlation taking 5% as the level of significance (p value ≤0.01). The statistical analysis was done by SPSS software version 19.

RESULTS

Table 1: NAFLD distribution in patients of CAD.

Total no of patients	Non NAFLD	NAFLD
100	54	46

Table 2: Distribution based on age.

Age	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	no	%	no
20-40	5	9.3	4	8.7	9
40-60	35	64.8	32	69.6	67
>60	14	25.9	10	21.7	24

46% of the total CAD patients had NAFLD and is significant.

69.6% of NAFLD patients were belonging to the age group 40-60 years. 21.7% were above 60 years.

Table 3: Gender distribution.

Sex	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	no	%	No
Male	9	16.7	4	8.7	13
Female	45	83.3	42	91.1	87

Females dominated in the NAFLD group (91.1%) and also in the non NAFLD group (83.3%).

Table 4: Distribution based on diabetes.

FBS	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	No	%	No
<126	47	87	23	50	70
≥126	7	13	23	50	30

In the NAFLD group 50% were diabetic whereas only 13% were diabetic in the non NAFLD group. FBS- Fasting blood sugar.

Table 5: Distribution based on total cholesterol.

Total cholesterol	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	No	%	No
<200	52	96.3	36	78.3	88
≥200	2	3.7	10	21.7	12

Majority of the patients in both groups were having lower cholesterol levels constituting 78.3% and 96.3% in the NAFLD and non NAFLD groups respectively.

Table 6: Distribution based on serum triglycerides.

Serum triglycerides	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	No	%	no
< 150	44	81.5	19	41.3	63
> 150	10	18.5	27	58.7	37

Serum triglyceride level was high in NAFLD patients (58.7%) compared to non NAFLD patients (18.5%).

All the NAFLD patients had low LDL level.

Table 7: Distribution based on LDL cholesterol.

LDL	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	No	%	no
> 100	2	3.7	0	0	2
< 100	52	96.3	46	100	98

Table 8: Distribution based on metabolic syndrome.

Metabolic syndrome	Non NAFLD	Non NAFLD	NAFLD	NAFLD	Total
	No	%	No	%	no
Negative	46	85.2	22	47.8	68
Positive	8	14.8	24	52.2	32

Metabolic syndrome also constituted a higher risk for NAFLD with a prevalence of 52.2%. Whereas only 14.8% of non NAFLD patients were having metabolic syndrome.

DISCUSSION

Non alcoholic fatty liver disease is a clinical entity where excessive triglyceride accumulation occurs in liver.¹⁵⁻¹⁷

The present study showed that the prevalence of NAFLD was highest in more than 40 years age group & in males. The findings of the study is in line with the Kalra et al study where the prevalence was the highest in 60-70 year age group.¹⁴

Most of the patients of NAFLD have no symptoms. Sometimes patient may complain of vague right upper quadrant pain & malaise. In this study also patients were having symptoms related to CAD but not that of NAFLD.

In a cross sectional study, Loannou et al compared the 10 year risk of cardiovascular events based on the Framingham risk score in patients with fatty liver disease & found that NAFLD is an independent risk factor for CAD. This study also favours the findings of the present study.¹⁸

In addition to increased prevalence of cardiovascular risk factors, several recent longitudinal studies have shown that cardiovascular disease is one of the most important causes of morbidity & mortality in patients with NAFLD.¹⁹⁻²¹ In a study among patients who were diagnosed to be NAFLD by biopsy, cardiovascular disease was the second most common cause of death after all of the cancers combined when they were followed up for a period of 18 years.²²

All the above mentioned facts point towards the significance of early detection of NAFLD which will help the patient in reducing the cardiovascular morbidity & mortality.

CONCLUSION

The study showed a direct correlation between NAFLD & CAD. NAFLD serves as an additional risk for the development of coronary artery disease. Metabolic syndrome, diabetes, increased total cholesterol & triglyceride level were also associated with increased risk for CAD. However LDL level was not found to be associated with NAFLD risk.

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