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Original Article

Assessment of endothelial changes in patients with Non-alcoholic fatty liver disease

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***ABSTRACT*:**

Background: Nonalcoholic fatty liver disease (NAFLD) has become the most common chronic liver condition. This study aimed at assessing endothelial changes in patients with Nonalcoholic fatty liver disease. **Materials & Methods:** The present study was conducted on 40 non-alcoholic fatty liver disease subjects and 40 healthy subjects (controls) without any fatty liver disease. Brachial artery diameter and its changes was determined by using a high resolution B mode ultrasonography system. Flow mediated vasodilatation (FMD) was calculated using the following formula: FMD = (d2-d1)/d1 x 100, where d2= Brachial artery diameter at 5 min post deflation and d1 = Base line brachial artery diameter. **Results:** Group I had 22 males and 18 females and group II had 23 males and 17 females. The mean DI in group I was 3.82 mm and in group II was 3.70 mm. The difference was non- significant ($p> 0.05$). The mean D2 in group I was 4.02 mm and I control was 4.19 mm. The difference was significant ($p< 0.05$). The mean flow mediated vasodilatation in group I was 0.17 and in group II was 0.42. The difference was significant ($p< 0.05$). **Conclusion:** Authors found that Non-alcoholic fatty liver disease (NAFLD) is a growing global health problem. There was lower FMD in brachial artery in patients with non-alcoholic fatty liver disease.

Key words: Brachial artery, Non-alcoholic fatty liver disease, Vasodilatation

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INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) has become the most common chronic liver condition in the United States with a general population prevalence of 20% to 40%. NAFLD is associated with insulin resistance, obesity, type 2 diabetes mellitus, and dyslipidemia.[1] In addition to the risk for advanced liver disease from nonalcoholic steatohepatitis, NAFLD confers an increased risk of cardiovascular disease (CVD). It is not fully established whether NAFLD increases CVD-related morbidity or mortality independent of known cardiovascular risk factors.[2]

NAFLD is regarded by many to be the hepatic manifestation of metabolic syndrome and therefore it may be linked to cardiovascular disease. NAFLD disease is a fast emerging global epidemic which is recognized as a common metabolic disorder that is closely associated with obesity and insulin resistance.[3]

Vascular endothelial dysfunction occurs early in the atherosclerosis process. Noninvasive measures of endothelial function and arterial stiffness, such as brachial artery flow-mediated dilation (FMD), fingertip peripheral arterial tonometry (PAT), and arterial tonometry, are associated with cardiovascular risk factors and with incident CVD. There have been several studies on the association of NAFLD and various markers of vascular structure and function.[4]

The presence of endothelial dysfunction with decreased nitric oxide (NO) production is considered to be the cornerstone for the development of NAFLD and cardiovascular diseases. Endothelial dysfunction is observed in patients with NAFLD, indicated by

decreased brachial artery flow-mediated dilation (FMD). Liver sinusoidal endothelial cells (LSECs) play a key role in maintaining the liver integrity and regeneration. Studies have shown that LSECs act as a "gatekeeper" and can prevent the progression of simple steatosis to NASH.[5] This study aimed at assessing endothelial changes in patients with Nonalcoholic fatty liver disease.

MATERIALS & METHODS

The present study was conducted in the department of Internal Medicine. It comprised of 40 non-alcoholic fatty liver disease subjects and 40 healthy subjects (controls) without any fatty liver disease. Patients were informed about the study and written informed consent was taken from all subjects. Ethical clearance of the study was obtained from institutional ethical committee. Data such as name, age, gender etc. was recorded. History of previous medications, alcohol, drug addiction was obtained. A thorough physical examination was done. Random blood sugar and fasting blood sugar was checked. All the subjects were investigated for fasting lipid profile and ultrasonographic evidence of fatty liver. Brachial artery diameter and its changes was determined by using a high resolution B mode ultrasonography system ENVISOR (Phillips) version B.O.-I having an electrical linear transducer mid-frequency of 7.5 m Hz. Flow mediated vasodilatation (FMD) was calculated using the following formula: FMD = (d2-d1)/d1 x 100, where d2= Brachial artery diameter at 5 min post deflation and d1 = Base line brachial artery diameter. The data was analyzed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

Gender	Group I (NAFLD)	Group II (Control)
Male	22	23
Female	18	17

Table I shows that group I had 22 males and 18 females and group II had 23 males and 17 females.

Table II Brachial artery diameter (D1) in both groups

Groups	D1	P value
Group I	3.82	0.07
Group II	3.70	

Table II shows that mean DI in group I was 3.82 mm and in group II was 3.70 mm. The difference was non-significant ($p > 0.05$).

Table III Brachial artery diameter D2

Groups	Mean	P value
Cases	4.02	0.01
Control	4.19	

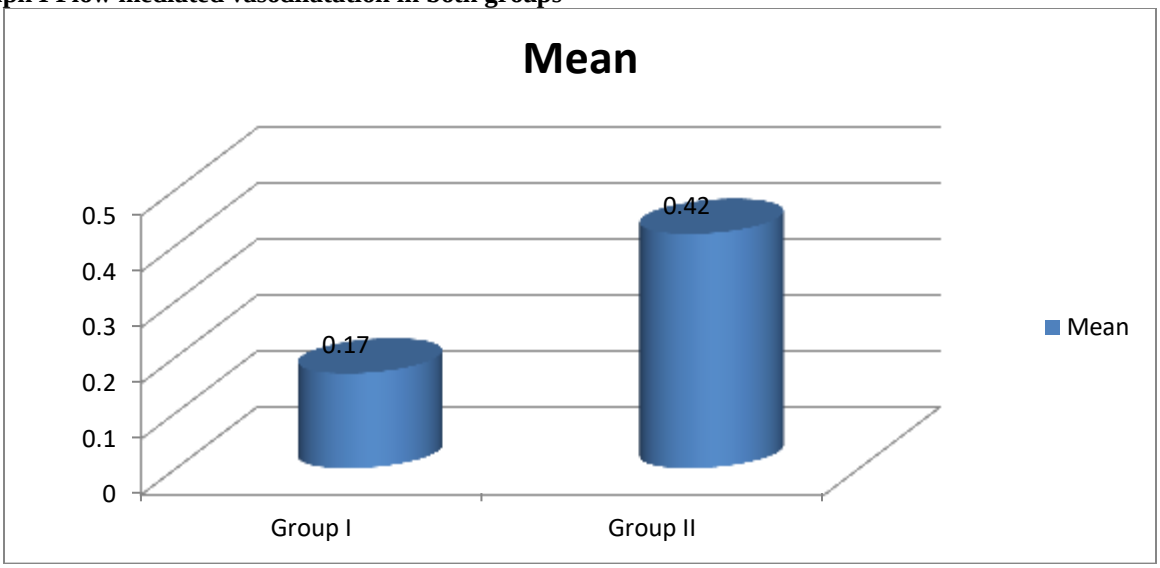
Table III shows that mean D2 in group I was 4.02 mm and I control was 4.19 mm. The difference was significant ($p < 0.05$).

Table IV Flow mediated vasodilatation in both groups

Groups	Mean	P value
Group I	0.17	0.001
Group II	0.42	

Table IV, graph I shows that mean flow mediated vasodilatation in group I was 0.17 and in group II was 0.42. The difference was significant ($p < 0.05$).

Graph I Flow mediated vasodilatation in both groups



DISCUSSION

Non-alcoholic fatty liver disease (NAFLD) encompasses the simple steatosis to more progressive steatosis with associated hepatitis, fibrosis, cirrhosis, and in some cases hepatocellular carcinoma. NAFLD is a growing epidemic worldwide, in part due to obesity and insulin resistance leading to liver accumulation of triglycerides and free fatty acids.[6,7] Numerous risk factors for the development of NAFLD have been espoused with most having some form of metabolic derangement or insulin resistance at the core of its pathophysiology. NAFLD patients are at increased risk of liver-related as well as cardiovascular mortality, and NAFLD is rapidly becoming the leading indication for liver transplantation. Liver biopsy remains the gold standard for definitive diagnosis, but the development of noninvasive advanced imaging, biochemical and genetic tests will no doubt provide future clinicians with a great deal of information and opportunity for enhanced understanding of the pathogenesis and targeted treatment.[8] This study aimed at assessing endothelial changes in patients with Nonalcoholic fatty liver disease.

In present study, group I had 22 males and 18 females and group II had 23 males and 17 females. We found that mean DI (brachial artery diameter) in group I was 3.82 mm and in group II was 3.70 mm. Khan et al[9] included a total of 100 patients study. Ultrasonographic examination of FMD was performed in the morning after an overnight fast and 15 minutes of rest in the supine position, using ultrasound scanner with a 10 MHz linear transducer. Normal range of FMD is known internationally as from 8 to 10. The total numbers of patients were 100 with the mean age of 34.55 ± 6.59 years. 49 patients (49.0%) were male while 51 patients (51.0%) were female. Mean baseline brachial artery diameter (mm) was 3.84 ± 0.67 and mean flow mediated dilatation (FMD) was 6.52 ± 65. Author revealed that mean FMD in brachial artery in patients with non-alcoholic fatty liver disease is below normal range (6.25±0.65).

We found that mean D2 in group I was 4.02 mm and I control was 4.19 mm. The mean flow mediated vasodilatation in group I was 0.17 and in group II was 0.42. Previous studies have shown that MS is significantly associated with endothelial dysfunction, impairing the vascular response to physiologic and pharmacologic stimuli. Ultrasound is relatively inexpensive and accessible, compared to other diagnostic techniques, our results suggest that ultrasound may be the imaging technique of choice for screening for the presence of fatty liver in clinical settings and, especially, population studies. The widespread use of ultrasound to detect fatty liver may help better identify the determinants and natural history of fatty liver disease in the general population and may help target interventions directed to reducing the complications associated with fatty liver.[10]

Shukla et al[11] conducted a study of endothelial dysfunction by flow mediated vasodilatation in NAFLD patients. 32 cases and 16 age and sex matched controls were included in the study. Flow mediated vasodilatation of the brachial artery was studied in both cases and controls. Anthropometric, clinical and biochemical assessment was also done. It was found that NAFLD patients had a significant endothelial dysfunction as assessed by flow mediated vasodilatation as compared with controls. Percentage change in FMD among NAFLD patients (13.54±3.65%) was found to

be lower than that in controls (16.84±4.61%) and difference was found to be statistically significant (p 0.010). Authors concluded that NAFLD patients have significant endothelial dysfunction even in the absence of traditional risk factors of cardiovascular disease.

The arterial endothelium is also a target for the atherosclerotic process. Atherosclerosis is associated with endothelial dysfunction in the very early stages of the disease process.16 Aging and exposure to risk factors such as hypercholesterolemia, hypertension, and smoking are also associated with endothelial dysfunction.[12]

CONCLUSION

Authors found that Non-alcoholic fatty liver disease (NAFLD) is a growing global health problem. There was lower FMD in brachial artery in patients with non-alcoholic fatty liver disease.

REFERENCES

1. Bhatia LS, Curzen NP, Calder PC, Byrne CD. Non-alcoholic fatty liver disease: a new and important cardiovascular risk factor? Eur. Heart J 2012;33:1190–1200.
2. Nseir W, Shalata A, Marmor A, Assy N. Mechanisms linking nonalcoholic Fatty liver disease with coronary artery disease. J Diges Dis Sci 2011;56: 3439-49.
3. Yasar C, Ebubekir S, Atakan Y, Yusuf Y, Oguzhan O, Levent D. Assessment of endothelial function in patients with nonalcoholic fatty liver disease. Endocrine 2013;43:100-7.
4. Angulo P. Nonalcoholic fatty liver disease. N Engl J Med 2002;346:1221-31.
5. Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS, et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. JAMA 2003;289:76-9.
6. Marchesini G, Avagnina S, Barantani EG, Ciccarone AM, Corica F, Dall'Aglio E, et al. Aminotransferase and gammaglutamyltranspeptidase levels in obesity are associated with insulin resistance and the metabolic syndrome. J Endocrinol Invest 2005;28:333–9.
7. Pacifico L, Nobili V, Anania C, Verdecchia P, Chiesa C. Pediatric nonalcoholic fatty liver disease, metabolic syndrome and cardiovascular risk. World J Gastr 2011;17:3082-91.
8. Marchesini G, Bugianesi E, Forlani G, Cerrelli F, Lenzi M, Manini R, Natale S, Vanni E, Villanova N, Melchionda N, Rizzetto M. Nonalcoholic fatty liver, steatohepatitis, and the metabolic syndrome. Hepatology 2003;37:917-23.
9. Khan N. Brachial Artery Flow Mediated Dilatation in Non-Alcoholic Fatty Liver Disease Patients by Vascular Ultrasound. Ann. Pak. Inst. Med. Sci. 2015;11(2):87-9.
10. Hu G, Qiao Q, Tuomilehto J, Balkau B, Borch-Johnsen K, Pyorala K. Prevalence of the metabolic syndrome and its relation to all-cause and cardiovascular mortality in nondiabetic European men and women. Arch Intern Med 2004;164:1066-76
11. Shukla V, Fatima J, Chaudhary S, Ali M, Mishra I. A Study of Endothelial Dysfunction in Patients of Non-Alcoholic Fatty Liver Disease. Journal of The Association of Physicians of India. 2017 Sep;65:18.
12. Perseghin G. The role of non-alcoholic fatty liver disease in cardiovascular disease. J Diges Dis Sci 2010;28:210-3.