

# Role of nonalcoholic fatty liver disease fibrosis score in overweight and obese nonalcoholic fatty liver disease

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## Abstract

Non-Alcoholic fatty liver disease can occur in obese and lean patients. Diabetes, obesity, and hypothyroidism are major treatable risk factors which can prevent the progression of NAFLD to NASH and CLD. Liver biopsy is considered as the gold standard for diagnosing NASH. Fibroscan a noninvasive technique is now being routinely used to detect the fibrosis of the liver. However, this facility is not available at every hospital. NAFLD fibrosis score and novel biomarkers cytokeratin 18 are being investigated as a marker of fibrosis. In this observational cross-sectional study, we tried to find out the NAFLD fibrosis score, fibroscan values in 30 overweight (BMI > 23.5kg/m<sup>2</sup>) and obese (BMI > 28.5kg/m<sup>2</sup>) NAFLD patients out of total 50 NAFLD patients diagnosed on the basis of ultrasonography. Blood tests including hemogram, KFT???, LFT???, lipid profile and ultrasonography and fibroscan were done in all cases. A value of > 0.676 was taken as significant fibrosis, -1.455 to ??? 0.675 as intermediate fibrosis, < -1.455 as absence of fibrosis. The mean age was 46.50 ± 12.33 years. There were 8 (26.7%) males and 22 (73.3%) females. The mean BMI was 30.08 ± 5.27. The mean ALT and AST was 54.17 ± 27.49 IU/L and 47.0 ± 21.92 IU/L respectively. The mean total cholesterol and triglyceride were 181.67 ± 49.13 and 199.63 ± 34.67 respectively. The mean TSH was 5.87 ± 5.09 mIU/L. The prevalence of hypothyroidism and diabetes was 11 (36.6%) and 20 (66%) respectively. Mean NAFLD score was -1.144 ± 1.47 and the fibroscan score was 7.5067 ± 2.25. Based on the NAFLD fibrosis score significant, intermediate and no fibrosis was observed in 6.7%, 56.7%, and 36.7% respectively.

Non-alcoholic fatty liver disease (NAFLD) is a common chronic liver disease affecting up to 30% of the general adult population in developed countries. Due to the high prevalence of obesity and diabetes, the incidence of NAFLD is increasing. The accumulation of elevated triglycerides in the liver parenchyma may lead to NAFLD. Nonalcoholic fatty liver disease can be interpreted as the hepatic manifestation of the metabolic syndrome, with a common pathophysiology. Nonalcoholic fatty liver disease has a strong association with cardiovascular disease (CVD) risk factors, such as diabetes, obesity, and metabolic syndrome. Moreover, NAFLD is associated with an

increased risk of CVD. On the other hand, there are data indicating no association between NAFLD and CVD. Given these results, the relation between NAFLD and CVD is still controversial. Liver biopsy is the gold standard for the assessment of NAFLD, but it is a procedure with potential complications. The NAFLD Fibrosis Score (NFS) is an index developed for the detection of liver fibrosis. The NFS is focused on simple parameters such as age, diabetes, platelets, albumin, body mass index (BMI), alanine aminotransferase (ALT), and aspartate aminotransferase (AST). This scoring system can accurately predict the presence or absence of advanced fibrosis in NAFLD.

Epicardial fat thickness (EFT) represents visceral adipose tissue around the heart within the pericardium. Epicardial fat is metabolically active producing cytokines causing endothelial dysfunction, oxidative stress, inflammation, and atherosclerosis. Epicardial fat thickness is measured by imaging techniques such as echocardiography, magnetic resonance imaging, and multidetector computer tomography. Echocardiography is easily accessible and relatively cheap, and these measurements of EFT show good correlation with magnetic resonance imaging. The Synergy between percutaneous coronary intervention with Taxus and cardiac surgery (SYNTAX) score is a comprehensive method based on coronary angiography (CAG) images depending on lesion location, complexity, and calcification.

It is a helpful tool for treatment decisions regarding the complexity of the coronary artery disease (CAD). We aimed to investigate the relation of NFS and EFT with CAD and SYNTAX score in patients undergoing elective CAG. This cross-sectional study was performed between September 2016 and March 2017 at Bozok University, Department of Cardiology. Patients who underwent elective diagnostic CAG due to suspicion of CAD were included in the study. Patients (n = 109) with ≥50% narrowing in ≥1 coronary artery were included in the CAD group; 50 patients without significant coronary narrowing were included as controls. Patients presenting with acute coronary syndrome and those with prior revascularization, heart failure (ejection fraction <50%), structural heart disease, acute or chronic infectious disease, hematological disease, hepatic insufficiency, renal insufficiency (creatinine >1.5 mg/dL), a history of excessive alcohol

intake ( $\geq 210$  g/wk for males and 140 g/wk for females), abnormal resting electrocardiography results (ischemic ST-segments, T-wave changes, or left bundle-branch blocks), insufficient medical records, and ongoing medications that may affect liver enzymes (eg, statins) were excluded from the study. Medical history, age, and gender were recorded. Weights and heights of participants were measured. Body mass index was calculated as (weight in kg)/(height in m<sup>2</sup>). Waist circumference (in centimeters) was measured midway between the lower costal margin and the iliac crest at the end of a normal expiration. Blood samples were obtained after overnight fasting. Complete blood counts and AST, ALT, fasting plasma glucose, creatinine, fasting total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C) were measured for all patients.

The main finding of the present study was the significant positive correlation of the SYNTAX score with EFT and the NFS. An additional important finding was that EFT positively correlated with the NFS. In multivariate analysis, EFT, NFS, and LDL-C were independently associated with the SYNTAX score. Since NAFLD has become one of the most common chronic liver diseases in developed countries, interest in this topic is increasing. Despite the accumulating data, the pathophysiology of NAFLD is still poorly understood.

Similar to metabolic syndrome, NAFLD is closely related to obesity, dyslipidemia, and glycemic disorders. Therefore, NAFLD may be considered as the hepatic manifestation of the metabolic syndrome. Furthermore, it is reported that patients with NAFLD have a higher risk of developing CVD and even cardiovascular death. Studies using multiline computed tomography demonstrated that NAFLD was associated with the incidence of coronary atherosclerosis and “unstable plaque” lesions.<sup>18</sup> The association of NAFLD with severity of coronary lesions in CAG was also reported.

The complexity of CAD evaluated by the SYNTAX score was independently associated with NFS and EFT. Additionally, the NFS was positively correlated with EFT. The NFS, as a non-invasive marker of NAFLD, can be easily determined in routine clinical practice to identify patients who are at high risk of CVD. Our findings need to be confirmed by prospective studies with larger populations and long-term follow-up.

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