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ORIGINAL ARTICLE

The Uncovering of the Hidden Connection Between MAFLD and Cardiovascular Risk

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ABSTRACT

Objective: Aim was to determine the connection between MAFLD and cardiovascular risk.
Methods: Total 224 patients were presented in this study. Participants in the study were chosen after they had undergone a thorough medical examination. Coronary artery calcium score (CACS), quantitative stenosis grade, coronary artery disease (CAD), and 10-year ASCVD risk were among the coronary risk surrogates that were examined in relation to fatty liver condition. SPSS 22.0 was used to analyze all data.
Results: Among 224 cases, 137 (61.2%) were males and 87 (38.8%) were females. Patients mean age was 61.8 years and had mean BMI 26.8 kg/m^2. Most common comorbidity was hypertension. Among all, 43 (19.2%) cases had previous history of CVD. We found independently association of MAFLD with CVD in multivariable analysis.
Conclusion: Our results suggest that MAFLD may be a more accurate predictor of cardiovascular disease risk, and that fibrosis evaluation may be useful for more in-depth prognosis in MAFLD patients.
Keywords: MAFLD, CVD, Hypertension

INTRODUCTION

According to the 2017 Global Burden of Disease research[1], CVD is responsible for almost 43% of the nearly 70% of fatalities globally that are attributed to noncommunicable disorders. Type 2 diabetes mellitus (T2DM) individuals account for the vast majority of cases of non-alcoholic fatty liver disease (NAFLD), which impacts almost 1 billion people worldwide[2]. One of the fastest-growing causes of liver-related mortality globally is nonalcoholic fatty liver disease (NAFLD)[3]. It is cardiovascular disease (CVD), not liver disease, that is the leading killer of people with NAFLD[4].

Metabolic abnormalities associated with excessive hepatic lipid accumulation in the absence of significant alcohol consumption and other recognized causes of liver disease have been characterized as nonalcoholic fatty liver disease (NAFLD) during the last forty years[5,6]. The increasing evidence connecting NAFLD to abnormalities in glucose and lipid metabolism as well as an elevated risk of cardiovascular disease led to the suggestion of a revision to the criteria in the early 2000s[7,8]. There is growing evidence that metabolic-associated fatty liver disease (MAFLD) is important in interdisciplinary care, and it supplanted non-alcoholic fatty liver disease (NAFLD) in 2020[9]. Since metabolic risk factors are required for MAFLD to be distinguished from NAFLD, rather than alcohol intake or other liver disorders being excluded, the diagnosis is more recent, which means that patients with MAFLD may go through a different clinical trajectory than those with NAFLD.

The MAFLD criteria improves the prediction of atherosclerotic cardiovascular risk progression [10]. It is important to mention that both the European and American guidelines recommend screening for CVD in persons with NAFLD[10]. It is of significant clinical interest to uncover the characteristics connected to CVD in this population, since CVD in MAFLD patients could be preventable if a good approach for early risk assessment were available.

To better describe fatty liver disease that is directly caused by metabolic abnormalities, experts have recently coined a new term, metabolic-associated fatty liver disease (MAFLD)[11]. The strong correlation between metabolic diseases and fatty liver disease inspired the creation of this phrase. Hepatic steatosis is known as metabolic syndrome with hyperlipidemia when it occurs in conjunction with obesity, type 2 diabetes, or another metabolic disorder[12]. The definitions of NAFLD and MAFLD suggest that about 80% of people with hepatic steatosis may simultaneously match both sets of criteria[10-12]. However, many patients still deserve to be considered, even if they only meet one of the criteria. Systemic metabolic abnormalities are necessary for the diagnosis of lean NAFLD, and individuals with alcoholic liver disease or other chronic liver disorders cannot be diagnosed with MAFLD[11,12]. Here, we can categorize patients with hepatic steatosis as either NAFLD-MAFLD, NAFLD-only, or MAFLD-only, depending on whether they have NAFLD and MAFLD together or separately. The transition from NAFLD to MAFLD will cause major shifts in clinical practices, including diagnosis, treatment approach, and comorbidity risk assessment.

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MATERIALS AND METHODS

This prospective/observational study was conducted at Department of Gastroenterology Muhammad Teaching Hospital Peshawar during August 2022 to April 2023 and comprised of 224 cases. The requirements for participation were straightforward: patients had to be 18 years old or older and meet the diagnostic criteria for MAFLD. The absence of written informed consent was the sole criterion for exclusion from the study. We classified individuals into two groups based on whether they had cardiovascular disease or not by recording their demographic and clinical data. Angina pectoris, myocardial infarction, coronary bypass grafting (CABG), stroke, carotid stenosis of 50% or more in diameter, peripheral artery disease, or coronary artery disease confirmed by angiogram were all criteria for the presence of CVD. In order to take part in the trial, all patients had to sign an informed consent document.

SPSS 22.0 was used to analyze all data. Categorical variables were assessed by frequencies and percentages. Multivariable logistic regression was used.

RESULTS

Among 224 cases, 137 (61.2%) were males and 87 (38.8%) were females.(fig 1)

Patients mean age was 61.8 years and had mean BMI 26.8 kg/m^2. 98 (43.8%) cases were educated. 58 (25.9%) cases had history of smoking. Most common comorbidity was hypertension, followed by hypercholesterolemia, CAD and DM.(tables 1)

Among all, 43 (19.2%) cases had previous history of CVD.(fig 2)

We found independently association of MAFLD with CVD in multivariable analysis.(table 2)

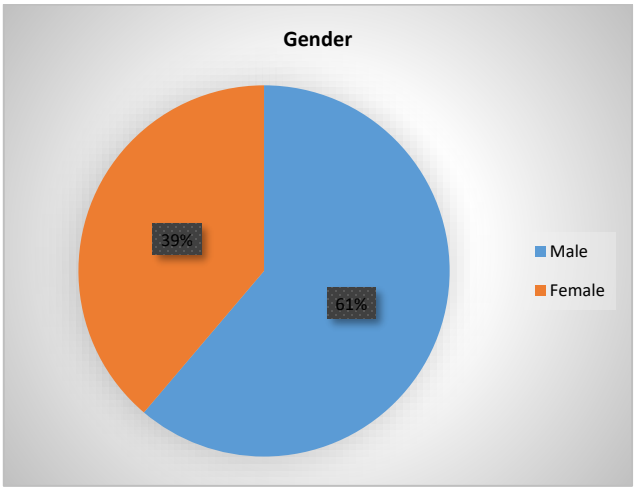

Figure-1: Gender presentation of the cases

Table-1: Baseline details of the presented cases

Variables	Frequency	Percentage
Age	61.8	
BMI	26.8	
Education status		
Educated	98	43.8
uneducated	126	56.2
Smoking history		
Yes	58	25.9
No	166	74.1
Comorbidity		
HTN	130	58.03
hypercholesterolemia	65	29.01
CAD	20	8.9
DM	9	4.01

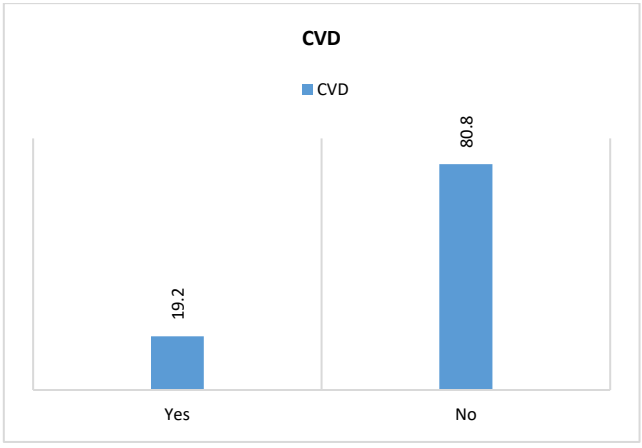

Figure-2: Previous history of CVD

Table-2: Correlation of MAFLD with CVD

Variables	Correlation	P Value
MAFLD	1.741	<0.05
NAFLD	0.654	0.02
Control cases	0.124	0.00

DISCUSSION

The following are the main conclusions drawn from this study: (i) we identified the most discriminative patient parameters that can be used to train a machine learning model to identify MAFLD patients at high risk of cardiovascular disease; (ii) we demonstrated that five easily-accessible clinical variables—hypercholesterolemia, left and right internal carotid artery plaque scores, duration of type 2 diabetes, and right internal carotid artery plaque area—are sufficient to train well-generalizing logistic regression classifiers to perform the aforementioned task; and (iii) we showed that the developed ML models were more clinically useful than the "treat all" and "no treatment" approaches. How the new definition of fatty liver will affect clinical practice is still unclear, even though it has only been out for a short time. In fact, this is more than just a name shift; unlike NAFLD, MAFLD may be identified in individuals with fatty liver and dysmetabolism regardless of reported alcohol consumption, but not in thin people without metabolic co-morbidities[13].

Cardiovascular disease was observed in 25% of the younger individuals in this study whose Fibroscan-confirmed MAFLD was present. Despite the fact that heart failure affects over 2% of the adult population globally, we were surprised to see that none of the patients had a history of the condition in their medical records[14]. Though unlikely, it's not out of the question given the large number of cases with cardiac insufficiency that go undiagnosed, according to epidemiological data[15].

Feature analysis revealed that clinical and biochemical indicators, as well as easily obtained ones from routine clinical practice, including carotid ultrasonography, can discriminate between individuals with overt CVD. Understanding the patient's parameters that may be linked to overt CVD allows clinicians to enhance CVD screening and prevention efforts, which is crucial from a practical standpoint because the silent disease presence precedes overt CVD by a long period. With area under the curve (AUC) values ranging from 0.84 to 0.87, the ML models trained on these characteristics demonstrated strong predictive capabilities. The suggested classifiers can achieve equivalent performance (with AUC surpassing 0.85), as shown in a recent study by Oh et al.[16] that investigated the Korean national epidemiological data. The highest risk factors for cardiovascular disease (CVD) were found to be hypertension, age, and gender, according to Oh et al.[17]. They also found a positive link between hypertension and age and body mass index (BMI), as well as a negative correlation between gender and alcohol use and monthly income. Alaa et al. found that self-reported health ratings and typical walking pace are two non-laboratory predictors of CVD that are straightforward to collect and might be utilized in practice[18].

In a more detailed examination of the top ten characteristics that can identify susceptible people, we find not only the more conventional risk factors, such as type 2 diabetes and hypertension, but also the usage of betablockers; all of these characteristics are positively linked to cardiovascular disease. The arterial stiffness measure, which is known to improve cardiovascular event prediction[19,20], was also positively correlated with CVD; it was an intriguing parameter among the top 15 associated with CVD. Conversely, overt CVD was negatively related with the other top 15 indicators, such as ALT, eGFR, and obesity. The surprise negative connection between ALT and obesity is apparent when viewed in relation to eGFR, an established risk factor for CVD, but it is perplexing when considered in isolation. One possible reason for the inverse relationship between obesity and CVD is the current cultural push for healthy lifestyles; the patients who took part in our study likely cared about their health because they responded to the advertisement.

CONCLUSION

Our results suggest that MAFLD may be a more accurate predictor of cardiovascular disease risk, and that fibrosis evaluation may be useful for more in-depth prognosis in MAFLD patients.

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