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Latest Trend and Perspective of Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) as a Novel Nomenclature

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Abstract

Recently, the medical term for nonalcoholic fatty liver disease (NAFLD) has been changed to a novel nomenclature: metabolic dysfunction-associated steatotic liver disease (MASLD). The latest report shows analyses of the National Health and Nutrition Examination Survey (NHANES III) using the fibrosis-4 index (FIB-4) and enhanced liver fibrosis (ELF). Among 6429 NAFLD cases, 99% met MASLD criteria. In another study with 4286 cases, 99% of steatosis cases met the MASLD definition, and 95.4% met the metabolic dysfunction-associated fatty liver disease (MAFLD) definition. Several biomarkers show a relationship with MASLD/MAFLD, such as BMI, T2D, HOMA-IR, central obesity, waist circumference, and CKD.

Keywords

Metabolic Dysfunction-Associated Steatotic Liver Disease, Nonalcoholic Fatty Liver Disease, National Health and Nutrition Examination Survey, Metabolic Dysfunction-Associated Fatty Liver Disease, Fatty Liver Index

Abbreviations

MASLD: Metabolic Dysfunction-Associated Steatotic Liver Disease; NAFLD: Nonalcoholic Fatty Liver Disease; NHANES III: National Health and Nutrition Examination Survey; MAFLD: Metabolic Dysfunction-Associated Fatty Liver Disease; FLI: Fatty Liver Index

Mini-Review

For decades, a prevalent metabolic issue has been observed in patients with nonalcoholic fatty liver disease (NAFLD). This encompasses several clinical conditions, including fatty liver, diabetes, metabolic syndrome, and atherosclerotic cardiovascular disease (ASCVD). A novel nomenclature, metabolic dysfunction-associated steatotic liver disease (MASLD), was proposed by a consensus group of multiple medical societies [1]. Many previously diagnosed NAFLD patients now appear to be reclassified and categorized as MASLD under the current nomenclature. Various associations and specific institutes have studied the differences and overlaps between NAFLD and MASLD using diverse data. Additionally, waist circumference adjustments are suggested based on race, ethnicity, or country. Furthermore, detailed analyses can elucidate increased risks of certain

diseases such as diabetes [2].

In a cross-sectional investigation of NAFLD and MASLD, a study was conducted on 3709 Japanese NAFLD cases. Notably, there was a difference in the waist circumference threshold: <94cm/<80cm for males/females in the original criteria compared to <85cm/<90cm in males/females for the previous Japanese criteria. The results indicated the following: i) under the original criteria, MASLD prevalence among NAFLD cases was 96.7%, ii) according to the Japanese criteria, 96.2% of NAFLD cases were reclassified as MASLD, and iii) the concordance between them was significantly higher in the original criteria (p=0.02) than in the Japanese criteria [3]. Similar results were found in Sweden, with 99% concordance [4].

In the latest report, analyses were conducted using extensive data from the National Health and Nutrition Examination Survey (NHANES III) [5]. The comparative data included clinical profiles and non-invasive examinations such as the fibrosis-4 index (FIB-4), enhanced liver fibrosis (ELF), and vibration-controlled transient elastography. Mortality outcomes were calculated from the NHANES-National Death Index. The study included 6429 NAFLD cases, with an average age of 54, 42% male, BMI of 35.4, Type 2 diabetes prevalence of 52%, and average waist circumference of 112cm. The average FIB-4 and ELF values were 1.69 and 9.6, respectively. 99% of the cases met MASLD criteria. The predictive accuracy for FIB-4 and ELF was identical for NAFLD and MASLD. While both NAFLD and MASLD exhibited similarities, some MASLD cases appeared to be slightly older with a somewhat higher risk of mortality, likely due to a higher cardiometabolic risk.

Regarding MASLD, several related factors were investigated for their relationships. A study analyzed 4286 cases aged 45-80 from the Salzburg Colon Cancer Prevention Initiative (SAKKOPI) study [6]. Steatosis was diagnosed via abdominal ultrasound, and biomarkers including CRP, ferritin, uric acid (UA), homeostasis model assessment-insulin resistance (HOMA-IR) score (cutoff: ≥2.5), and cardiovascular risk as SCORE2/ASCVD were measured. The results showed an average age of 59.4 years, BMI of 27.0, 9.2% prevalence of Type 2 diabetes, 44.4% steatosis, 47.1% elevated HOMA-IR, and 78.8% central obesity (≥102/88 cm in males/females). 99% of steatosis cases met the MASLD definition, 95.4% met the metabolic dysfunction-associated fatty liver disease (MAFLD) definition, and 53.6% met the metabolic syndrome definition. Waist circumference, HOM-IR, and blood triglyceride values were identified as the most relevant factors for explaining the presence of steatosis using forward stepwise regression.

Concerning the combined issues of NAFLD and chronic kidney disease (CKD), a recent report provided detailed analyses of the novel nomenclature MAFLD and CKD [7]. In 2023, a modified Delphi process was conducted by three large international hepatic associations. Following the change from NAFLD to MAFLD, an evaluation of the epidemiological situation and the combined status of MAFLD and CKD was performed. The results indicated that the combination of MAFLD/MASLD and CKD appeared to show a substantially higher incident risk of CKD compared to cases without MASLD.

In Japan, there has been a notable increase in the prevalence of fatty liver, NAFLD, diabetes, metabolic syndrome, and related conditions in recent years. This rapid rise in liver cirrhosis with fatty liver has become a significant concern due to the increasing obesity population. A report discusses the current situation of MASLD/NAFLD in the younger generation and provides nutritional recommendations from the Japan Obesity Society (JOS) [8]. The study included 322 graduate university students just after admission to the university, using a behavioral questionnaire for analysis. The results revealed a 11% prevalence of MASLD/NAFLD, along with observed medical misconceptions regarding weight and constitution in relation to MASLD/NAFLD. Multivariate analyses indicated that MASLD was associated with eating habits and perceptions of weight/constitution, while NAFLD was associated with perceptions of weight/constitution. The questionnaire on eating behavior allowed graduate individuals to identify areas for improvement, potentially reducing the risk of MASLD/NAFLD and extending healthy life expectancy.

Several important points are known about MASLD. Formerly known as NAFLD, MASLD is a type of liver disease not caused by alcohol consumption [9]. Its definition identifies cases with fatty liver (hepatic steatosis) associated with at least one cardiometabolic risk factor from the following: obesity or overweight (BMI 23 and above for Asians), Type 2 diabetes, and other abnormal biomarkers including blood glucose, HOMA-R, HDL-C, triglycerides, blood pressure, and waist circumference. Diagnosis of MASLD can be made using non-invasive measures such as biomarkers, abdominal ultrasound, or abdominal CT scans. The fatty liver index (FLI) is a novel index that can be useful in clinical practice, calculated from waist circumference, BMI, TG, and r-GTP to detect hepatic steatosis. Higher FLI values suggest an elevated risk of hypertension, diabetes, and CKD [9]. Additionally, a new category called MetALD was introduced for individuals with high alcohol intake (210-420g per week in males and 140-350g per week in females) who also exhibit features of obesity or overweight [10].

In summary, this report has provided the latest trends and information regarding MALFD, MASLD, and related matters [11]. Significant changes are currently observed in this field, and this article aims to be useful for clinical practice.

Conflict of Interest

The author has read and approved the final version of the manuscript. The author has no conflicts of interest to declare.

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