

Streszczenie w języku angielskim

Introduction

Metabolic dysfunction–associated steatotic liver disease (MASLD) is a common chronic liver disease in patients with fatty liver and cardiometabolic risk factors. Its prevalence and severity are higher in men than in women of reproductive age; however, the prevalence increases in women after menopause. MASLD patients are at higher risk of cardiovascular death than of liver-related mortality. Vitamin D deficiency is an important health problem. Numerous studies reported a link between vitamin D deficiency and cancer as well as autoimmune and metabolic diseases. However, there is limited data on the association between vitamin D deficiency and MASLD.

Aim of the study

The aim of the presented doctoral dissertation is to evaluate the association of MASLD with vitamin D deficiency and to assess sex-related differences in the incidence and clinical characteristics of patients with MASLD, with particular attention to comorbidities.

Methodology

This study was based on the analysis of medical data of patients hospitalised at an internal medicine unit from January 2018 to December 2023.

Results of publication no. 1

Metabolic dysfunction-associated fatty liver disease (MASLD) is a highly prevalent comorbidity among cardiological, diabetic, and endocrine patients. Diagnosis of MASLD is important because the presence of this disease has a significant impact on the prognosis related to not only hepatic but, most importantly, cardiovascular events. The definition of SLD has been modified in recent years as new knowledge about the disease has emerged. In 2023, new diagnostic criteria were adopted that have simplified the diagnosis process. The publication summarizes the evolution of the definition of MASLD and its significance, in relation to extrahepatic clinical manifestations.

Results of publication no. 2

Sex-related differences in the prevalence, clinical characteristics, and comorbidities of metabolic dysfunction-associated steatotic liver disease

In this retrospective study, we evaluated the medical histories of patients admitted to an internal medicine ward. The medical histories of 887 patients with MASLD were assessed, including 461 women (52.0%) and 426 men (48.0%). The median age of patients was 70 years (range, 18-96 years). Hypertension and cholelithiasis were more common in women

than in men (81.8% vs. 73.7%, $p=0.040$ and 27.3% vs. 19.2%, $p=0.005$, respectively). In contrast, a history of heart failure (38.5% vs. 32.1%, $p=0.046$), acute pancreatitis (4% vs. 1.7%, $p=0.043$), and smoking (40.5% vs. 19.1%, $p<0.001$) was more common in men than in women. However, effect size measures indicated that these associations were weak or very weak. Cardiovascular risk was assessed as very high in 73.5% of participants and as high in 17.4%, with no significant differences between sexes. Our findings indicate a high prevalence of obesity, metabolic disorders, cardiovascular disease, and high or very high cardiovascular risk in patients with MASLD. The absence of significant sex-related differences may be attributable to the median age of the cohort. In patients with this clinical profile, MASLD should be considered, and personalized preventive and therapeutic strategies for comorbidities are recommended.

Results of publication no. 3

The association between vitamin D deficiency and MASLD.

The study included 446 patients (57% women). MASLD was diagnosed in 41% of patients (20.6% women). The mean age of patients with MASLD was 65.8 ± 14.4 years and that of patients without MASLD was 70.6 ± 16.8 years. Optimal vitamin D levels were noted in 13.1% of patients with MASLD vs. 21.7% of those without MASLD ($p = 0.0211$). Patients with MASLD more often had diabetes (59.1% vs. 31.8%, respectively, $p < 0.0001$) and overweight or obesity (34.4% vs. 15.2%, respectively, $p < 0.0001$). Patients with MASLD also had higher levels of total cholesterol (159.3 mg/dl vs. 145.3 mg/dl, $p = 0.0361$), triglycerides (145.8 mg/dl vs. 107.2 mg/dl, $p < 0.0001$), uric acid (6.1 mg/dl vs. 5.8 mg/dl, $p = 0.0422$), AST (69.8 U/l vs. 41.5 U/l, $p < 0.0001$), and ALT (50.2 U/l vs. 32.8 U/l, $p < 0.0001$). We compared the clinical characteristics between men and women according to the different ranges of vitamin D levels. The ROC curve analysis did not show a significant association between vitamin D levels in any of the ranges and the presence of MASLD. Based on the Youden index, the cutoff value for vitamin D of 27.6 ng/ml was determined and considered in the statistical analyses. In 79.8% of patients with MASLD, vitamin D levels were 27.6 ng/ml or lower, while 20.2% of patients had vitamin D levels higher than 27.6 ng/ml. Among patients without MASLD, 69.6% had a vitamin D level of 27.6 ng/ml or lower, and 30.4% had levels higher than 27.6% ($p = 0.0160$). A univariable analysis of the predictors for MASLD was performed. The multivariable regression analysis revealed the following predictors of MASLD: male sex, diabetes, obesity or overweight, and vitamin D levels of 27.6 ng/ml or lower. The age of 80 years or older was associated with a lower risk of MASLD.