Journal of Obesity & Metabolic Syndrome 2020;29:158-159
https://doi.org/10.7570/jomes20018

Letter

jomes
pISSN 2508-6235
eISSN 2508-7576

Letter: Sarcopenia Is Significantly Associated with Presence and Severity of Nonalcoholic Fatty Liver Disease (J Obes Metab Syndr 2019;28:129–38)

Chan-Hee Jung*

Division of Endocrinology and Metabolism, Department of Internal Medicine, Soonchunhyang University Bucheon Hospital, Soonchunhyang University College of Medicine, Bucheon, Korea

Received February 25, 2020
Reviewed March 8, 2020
Accepted March 9, 2020

*Corresponding author
Chan-Hee Jung

https://orcid.org/0000-0001-8988-0187

Division of Endocrinology and Metabolism, Department of Internal Medicine, Soonchunhyang University College of Medicine, 170 Jomaru-ro, Wonmi-gu, Bucheon 14584, Korea
Tel: +82-32-621-5158
Fax: +82-32-621-5016
E-mail: chanhij@hanmail.net

Nonalcoholic fatty liver disease (NAFLD) and sarcopenia have both been recognized as risk factors for cardiometabolic diseases.[1] Various common risk factors such as insulin resistance, obesity, chronic low-grade inflammation, oxidative stress, physical inactivity, and the presence of hepatokines and myokines may be involved in the development of these two conditions.[2] Recently, a considerable body of evidence has revealed a significant relationship between NAFLD and sarcopenia.[3] Sarcopenia may therefore play a role in the pathogenesis of NAFLD and its severity.[4]

In a recent issue of the *Journal of Obesity and Metabolic Syndrome*, Chung et al.[5] analyzed the association between sarcopenia and the presence and severity of NAFLD in 5,989 Koreans who underwent an annual health checkup examination. The authors specifically investigated the existence of any modification effect according to age, sex, obesity, abdominal obesity, and diabetes mellitus. There was a significant interaction for effect modification in the association between sarcopenia and NAFLD by age, while differences between subgroups according to sex, obesity, abdominal obesity, and diabetes mellitus were insignificant. The authors[5] categorized age into tertiles (T1, 19–49 years; T2, 50–57 years; T3, 58–87 years) and found that the adjusted odds ratio (OR) was higher in younger age groups (T1 vs. T2 vs. T3: OR, 1.46 vs. 1.31 vs. 1.22, respectively; *P* of interaction for effect modification = 0.007). This finding suggests that a younger age exerts a greater magnitude on the association between sarcopenia and NAFLD. This key finding of Chung et al.'s study[5] is inconsistent with other published studies for unclear reasons thus far, according to the authors. However, in my opinion, some additional analyses and considerations may help to explain and support their finding.

Comparisons of the clinical and laboratory characteristics by tertile age group may offer clues about the higher impact of a younger age. Insulin resistance is the most important risk factor for both NAFLD and age-related sarcopenia.[2] Although the authors did not use an index to identify insulin resistance, such as the homeostatic model assessment of insulin resistance, they could have assessed other patient variables, such as body composition, fasting blood glucose, blood pressure, and high density lipoprotein-cholesterol and triglyceride levels. These variables may reflect insulin resistance indirectly. In the same manner, the authors also did not investigate the effect of chronic, low-grade inflammation on the relationship of sarcopenia and NAFLD. The

authors need to conduct further analyses using high-sensitivity C-reactive protein (hsCRP) data instead of tumor necrosis factor and interleukin-6, especially when hsCRP levels are available in patients' health checkup data.

Most previous studies have demonstrated a positive association between sarcopenia and NAFLD in the elderly.[6,7] Srikanthan et al.[8] performed a study to determine whether sarcopenia is associated with impairment in insulin sensitivity and glucose homeostasis using National Health and Nutrition Examination Survey III data in participants 20 years of age or older. They found that there were important differences in the effect of sarcopenia and obesity on insulin resistance and dysglycemia by age. In those under 60 years of age, sarcopenia was strongly associated with greater rates of insulin resistance irrespective of the presence of obesity. In contrast, in participants 60 years of age or older, sarcopenia did not add to the risk for insulin resistance in obese adults. The authors explained that this remarkable difference in the effect of sarcopenia on insulin resistance and dysglycemia by age is likely the result of differences in the etiology of sarcopenia. In addition, the distribution and role of muscle fibers type I and II and lipid content within skeletal muscle may also contribute to age-related differences in insulin resistance. Although the study by Srikanthan et al.[8] did not evaluate NAFLD directly, we offer these speculations as possible mechanisms for the different associations of sarcopenia and NAFLD with age. However, of course, further prospective studies that adjust for important variables, such as an insulin resistance index, chronic-low grade inflammatory markers, and myokines, will be needed to identify these mechanisms.

Nonetheless, the paper by Chung et al.[5] in the *Journal of Obesity and Metabolic Syndrome* makes an important contribution to the field of sarcopenia and NAFLD. Their data provide unique evidence that a younger age has a greater impact on the ability of sarcopenia to predict the presence of NAFLD than does an older age.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

REFERENCES

1. Han E, Lee YH. Non-alcoholic fatty liver disease: the emerging burden in cardiometabolic and renal diseases. Diabetes Metab J 2017;41:430-7.
2. Kim JA, Choi KM. Sarcopenia and fatty liver disease. Hepatol Int 2019;13:674-87.
3. Cai C, Song X, Chen Y, Chen X, Yu C. Relationship between relative skeletal muscle mass and nonalcoholic fatty liver disease: a systematic review and meta-analysis. Hepatol Int 2020; 14:115-26.
4. Yu R, Shi Q, Liu L, Chen L. Relationship of sarcopenia with steatohepatitisand advanced liver fibrosis in non-alcoholic fatty liver disease: ameta-analysis. BMC Gastroenterol 2018;18:51.
5. Chung GE, Kim MJ, Yim JY, Kim JS, Yoon JW. Sarcopenia is significantly associated with presence and severity of nonalcoholic fatty liver disease. J Obes Metab Syndr 2019;28:129-38.
6. Lee MJ, Kim EH, Bae SJ, Kim GA, Park SW, Choe J, et al. Age-related decrease in skeletal muscle mass is an independent risk factor for incident nonalcoholic fatty liver disease: a 10-year retrospective cohort study. Gut Liver 2019;13:67-76.
7. Zhai Y, Xiao Q, Miao J. The relationship between NAFLD and sarcopenia in elderly patients. Can J Gastroenterol Hepatol 2018; 2018:5016091.
8. Srikanthan P, Hevener AL, Karlamangla AS. Sarcopenia exacerbates obesity-associated insulin resistance and dysglycemia: findings from the National Health and Nutrition Examination Survey III. PLoS One 2010;5:e10805.