



# Association of Myosteatorsis with Nonalcoholic Fatty Liver Disease, Severity, and Liver Fibrosis Using Visual Muscular Quality Map in Computed Tomography (*Diabetes Metab J* 2023;47:104-17)

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We appreciate Dr. Roh's comments on our recent article, "Association of myosteatorsis with nonalcoholic fatty liver disease, severity, and liver fibrosis using visual muscular quality map in computed tomography" [1]. We are also grateful for the additional opportunity to discuss different views on this topic.

We agree with Dr. Roh's remarks on the findings of our study, as they clearly reflect and emphasize the background of our study. Regarding the relationship between nonalcoholic fatty liver disease (NAFLD) and sarcopenia, previous studies primarily focused on low skeletal muscle mass as a possible risk factor for NAFLD [2-4]. As Dr. Roh mentioned, the reverse relationship was demonstrated for the first time in her recently published article, in which elderly people with high hepatic steatosis index and fatty liver index showed increased risk of low muscle mass and low muscle strength (measured as handgrip strength) [5]. The complexity of liver-muscle cross-talk is noted, as sarcopenia and NAFLD share common pathophysiologic mechanisms, which may explain the mutual associations between the two. These mechanisms include insulin resistance, chronic inflammation, and changes in regulation of myokines and hepatokines [6].

Additionally, Dr. Roh discussed the emphasis on low muscle strength in the updated definition of sarcopenia. Dr. Roh's recent study (mentioned above) measured handgrip strength to evaluate muscle strength [5]. We measured muscle quality by measuring skeletal muscle attenuation on computed tomography (CT). Muscle with low attenuation represented lipid-rich and poor quality muscle. As more studies start to evaluate muscle strength and quality, we look forward to more consistent results being obtained through well-controlled longitudinal studies on muscle and liver health in near future.

With respect to myosteatorsis, we have looked into its association with various cardiometabolic diseases, all of which have shown consistent results. Other than NAFLD, poor quality muscle was associated with an increased prevalence of hypertension [7], dyslipidemia (not yet published), type 2 diabetes mellitus [8], and subclinical coronary atherosclerosis [9]. Dr. Roh recommended that future studies seek to identify optimal cutoffs for muscle fat; however, our study group recently presented sex-specific diagnostic cutoff points for myosteatorsis based on T-scores measured by CT and suggested normal attenuation muscle area (NAMA) divided by total abdominal

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muscle area (TAMA), the so-called NAMA/TAMA index, as a new index for good quality muscle and myosteatosi [10]. This could provide useful information about myosteatosi, muscle quality, and associated cardiometabolic risk in people with previous abdominal CT scans in future studies.

Once more, we thank Dr. Roh for her comprehensive review and valuable comments.

## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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