

Association of Thigh Muscle Mass with Insulin Resistance and Incident Type 2 Diabetes Mellitus in Japanese Americans (*Diabetes Metab J* 2018;42:488-95)

Nan Hee Cho, Hye Soon Kim


Department of Internal Medicine, Keimyung University School of Medicine, Daegu, Korea

Skeletal muscle is a major tissue responsible for the majority of insulin-stimulated glucose uptake in the body [1]. Muscle quantity and quality are regarded to play an important role in the development of type 2 diabetes mellitus (T2DM), as well as related metabolic disorders. Previous studies have demonstrated the cross-sectional associations between low muscle mass and strength, and insulin resistance and prevalent diabetes [2-4]. Recently, however, a few prospective studies have been conducted focusing on confirming the causality and suggested that low muscle mass and strength are potential risk factors for the development of diabetes, although there are some conflicting results [5-7].

In this issue, Han et al. [8] investigated the association of thigh muscle mass measured by computed tomography (CT) with insulin resistance and incident T2DM over a 10-year follow-up in a Japanese American cohort. The mean age of study participants was 51.6 years. Among 399 participants, 22.1% developed diabetes. The authors showed that the thigh muscle area measured by CT was inversely associated with future insulin resistance after adjustment for covariates including total abdominal fat area and thigh subcutaneous fat area. In addition, they found that greater thigh muscle area was associated with lower risk of incident T2DM for subjects with lower levels of body mass index (BMI), but this association was not seen in those with higher BMI levels. This clearly shows that greater thigh muscle area predicts a lower risk of incident T2DM for

lean individuals. It would have been more valuable if the authors measured the thigh intramuscular or intermuscular fat content, which is significantly associated with insulin resistance [9]. Also, we would like to ask if the authors investigated the relationship between abdominal fat distribution and thigh muscle mass, as well as incident T2DM. Nevertheless, these findings are meaningful as they are because the results are based on a well-designed cohort with a long-term follow-up period, and it extends prior findings by showing consistent results with the earlier Health ABC study. There also was an inverse association between abdominal muscle and thigh muscle area, and incident diabetes in normal-weight women in the Health ABC study of elderly Caucasian and African Americans. However, this finding was difficult to generalize, because the study participants were older than 70 years and the results varied by sex [6].

It is interesting to note that BMI acts as an effect modifier in the association between muscle mass and T2DM risk. Previous studies also showed diminution of the inverse association between muscle and T2DM risk at higher BMI levels [5,6]. The underlying mechanism is unclear, but there has been speculations that the harmful effects of excess adiposity overpowered the benefits of muscle for obese individuals [8]. This finding suggests that muscle mass could play a stronger role in metabolic health in those without excess adiposity, which may be related to normal weight-obesity. In addition, particularly for

Corresponding author: Hye Soon Kim  <https://orcid.org/0000-0001-6298-3506>
Department of Internal Medicine, Keimyung University Dongsan Medical Center,
Keimyung University School of Medicine, 56 Dalseong-ro, Jung-gu, Daegu 41931, Korea
E-mail: hsk12@dsmc.or.kr

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normal weight individuals, the need to increase muscle mass should be emphasized. To establish this view, further research is needed to determine whether increasing muscle mass could prevent diabetes and whether the effect varies with BMI.

CONFLICTS OF INTEREST

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

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