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## The Implications of Sarcopenia and Sarcopenic Obesity on Cardiometabolic Disease

Tae-Nyun Kim  
Inje University, Korea

Over the past decade, the prevalence of obesity and sarcopenia has exploded in the aging society. The age-related body composition changes are a decrease in skeletal muscle and an accumulation of body fat preferentially in the intraabdominal area. Theoretically, age-related loss of muscle mass, a biological process named sarcopenia, may be associated with the excessive accumulation of visceral fat. Conversely, visceral obesity is known to be associated with future loss of skeletal muscle mass. These changes occur even when there are no significant changes in body mass index and have important consequences on the profile of metabolic and cardiovascular risk factors.

Although the explanations for the mechanism of sarcopenic obesity need to be elucidated, a vicious circle between sarcopenia and obesity may be mainstay of sarcopenic obesity development. Loss of muscle mass decreases resting metabolic rate, physical activity, insulin sensitivity, and functions of myokine, muscle-derived secreted protein, and might lead to visceral obesity. The accumulation of visceral adipose tissue induces chronic inflammation, oxidative stress, and insulin resistance, via

producing adipokines and proinflammatory cytokines which contribute to the development and progression of sarcopenia. Furthermore, recent studies suggest that sarcopenic obesity is related to metabolic disorders, including metabolic syndrome, type 2 diabetes, and cardiovascular disease. However, studies that analyzed the association between sarcopenic obesity and cardiometabolic disease showed inconsistent findings, which might be caused by the lack of standardized diagnostic methods.

Sarcopenic obesity and cardiometabolic disease likely interact with each other and share common pathologic processes such as inflammation, oxidative stress, and insulin resistance. There are strong theoretical reasons that sarcopenic obesity will be a predictor of cardiovascular disease. The evidence available in support of this hypothesis has been starting to emerge, although further research is still required. Improving our understanding of the concept of sarcopenic obesity might be helpful for alleviating the global threat of sarcopenic obesity in the aging society.