



## Perspectives on Sarcopenia and Protein Intake in Aged and Diabetic Patients

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### Abstract

The relationship among sarcopenia, protein intake, elderly, and diabetes has been in discussion. The Asian Working Group for Sarcopenia (AWGS) 2019 has revised the content by emphasizing the 5-time chair stand test. For prevention and treatment of sarcopenia and frailty, continuous protein intake is required such as meat, eggs, tofu, and so on. Elderly aged >65 is recommended to take at least >1.0 g/kg weight of protein per day for preventing sarcopenia and frailty. Sodium/glucose cotransporter-2 inhibitors (SGLT2i) have been widely used. However, SGLT2i are advised not to provide the subjects who are elderly and/or with sarcopenia or senile syndrome.

### Keywords

Sarcopenia, Asian Working Group for Sarcopenia (AWGS) 2019, Protein Intake, Sodium/Glucose Cotransporter-2 Inhibitors (SGLT2i), Low Carbohydrate Diet (LCD)

### Abbreviations

AWGS: Asian Working Group for Sarcopenia; SGLT2i: Sodium/Glucose Cotransporter-2 Inhibitors; LCD: Low Carbohydrate Diet

As to sarcopenia, clinical and research interest has burgeoned internationally [1]. The Asian Working Group for Sarcopenia (AWGS) 2019 has revised the diagnosis, protocols, and criteria to some degree. It emphasized the evaluation of the 5-time chair stand test and possible sarcopenia in primary health care for earlier lifestyle interventions [1]. Regarding the severity of sarcopenia, physical performance can be determined by several kinds of assessments. Among them, the gait speed or 5-times chair stand test seems to be practically simple and useful for actual

evaluation [2].

For sarcopenia and/or pre-sarcopenia, the efficacy for multi-component exercise programs was evaluated on muscle mass and physical function in elderly people [3]. Subjects included 72 elderly and the exercise group tended to prevent the decrease of muscle mass. By exercise program for 12 weeks, physical function was improved in the intervention group [3]. Sarcopenia has been associated with cognitive impairment in the elderly, and their relationship was studied [4].

## Commentary

Participants were  $61.9 \pm 8.0$  years ( $n=3810$ ) and evaluated by AWGS 2019, Short Portable Mental Status Questionnaire (SPMSQ), and Mini Nutritional Assessment Short Form (MNA-SF). The results showed that i) the relationship was significantly mediated by the nutritional situation and ii) early nutritional interventions may be effective for preventing cognitive decline.

Regarding the prevention and treatment of sarcopenia and frailty, a clinically important matter is continuous protein intake [5]. The general public may think that most of the components of meat are proteins. However, it is different and far from the fact. The standard values for the protein content per 100 g of edible portion are shown as follows: chicken 19.7g, beef red meat 16.8g, pork rose meat 12.8g, wiener sausage 10.5g, ribs 16.4g, bigeye tuna 21.9g, chicken egg 11.3g, natto 14.5g, tofu 6.7g, and so on [6].

In recent years, the concept of a low carbohydrate diet (LCD) has been widespread, and the clinical significance for taking protein has been more emphasized [7]. Ministry of Health, Labor, and Welfare of Japan has announced dietary intake standards (2020 edition). Among them, for the purpose of preventing frailty and sarcopenia, it was recommended to take at least 1.0 g/kg body weight or more of protein per day for people aged 65 and over [8]. In other words, it is estimated to be about >60g every day and >20g per meal. If the subject is undernourished, more intake of protein is required. Low-fat meats contain about 20g of protein per 100g such as fish, chicken fillet, and lean beef. On the other hand, the protein content is lower in meats with many fats and oils such as ribs and processed meats.

Some important points are found to get enough protein. Firstly, it is recommended to eat three times a day, and do not miss a meal. Secondly, be sure to take protein-containing foods with each meal. Do not increase your staple food, and be a little careful with meat containing too much fat. With this diet, one will not gain weight unless taking much carbohydrate. Thirdly, eggs are easy to use [9]. One-piece (50g) contains 76 kcal, protein 6.2g, fat 5.2g, carbohydrate 0.2g, and the protein score 100, and then it is no

problem to take several eggs a day. Soy and dairy products are available to those who have difficulty eating meat. To get 20g of protein from tofu, a 300g intake is needed [9]. Therefore, it is recommended to take it together with meat and fish. One can also add dairy and egg proteins with gratin, cream stew, piccata, etc., rather than single dishes. It is also possible to add tofu or fried tofu to Japanese miso soup. When taking noodles, some protein materials as a topping would be added such as eggs, tuna cans, and natto [10]. Vitamin D is also important for protein synthesis and is abundant in fish such as mushrooms, sardines, saury, and salmon.

Several debates have been found as to whether protein intake should be recommended for patients with impaired renal function. There is evidence that protein restriction prevents progression to end-stage renal disease (ESRD) in chronic kidney disease (CKD) [11]. On the other hand, protein restriction may increase mortality in patients with older CKD. This mechanism involves the presence or absence of sarcopenia. Based on the above situation, the Japanese Society of Nephrology published "Recommendations for Diet for Conservative CKD with Sarcopenia Frail" in 2019 [12]. Among them, protein intake should be set flexibly by examining whether to emphasize the prevention of ESRD or the risk of death [13]. In cases of high risk of death or severe sarcopenia, it is recommended to loosen protein intake restrictions. However, in the case of CKD 4-5 stage, it seems appropriate to set an upper limit of 0.8 g/kg body weight per day for protein intake. Sarcopenia and frailty are important clinical issues in elderly diabetes. How should we evaluate, intervene, and treat these problems? [14] Our group has been involved in diabetes treatment for many years [15]. Among them, a low carbohydrate diet (LCD) was initiated for the first time in Japan, and LCDs have been performed for thousands of obese and diabetic patients [16].

A study examining the effects of Sodium/glucose cotransporter-2 inhibitors (SGLT2i) on body composition in T2DM patients was recently reported [17]. In a sub-analysis aged 65-74 years, SGLT2 inhibitors did not bring a decrease in muscle mass or strength compared to metformin. However, these

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subjects were slightly obese with a BMI of  $\geq 22$  and an average BMI of 27 associated with maintained muscle mass and strength. On the other hand, the effect of SGLT2i has not been clear on muscle mass and strength of elderly people  $>75$  years and/or lean patients. As to the proper use of SGLT2i, recommended comments are presented [18,19]. It indicates that caution should be required when the subject is aged  $>75$ , or 65-74 years associated with sarcopenia or senile syndrome. In such patients, it is important to carefully determine the administration of SGLT2i and to ensure that protein intake and exercise are adequate when used [18]. Furthermore, it recommends observing weight, muscle strength, and motor function on a regular basis, and choosing the option to refrain or discontinue if those factors show a clear decrease [19].

In summary, several topics are introduced here concerning the relationship between sarcopenia, protein intake, the elderly, and diabetes. These descriptions will hopefully become one of the references for future development of clinical practice and research.

### Conflict of Interest

The author has read and approved the final version of the manuscript. The author has no conflicts of interest to declare.

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