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THE IMPORTANCE OF EARLY DIAGNOSIS AND TREATMENT OF SARCOPENIA IN THE PREVENTION OF FALLS IN THE ELDERLY

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ABSTRACT

Objective: The aim of this study was to identify early diagnostic methods and determine their importance, as well as to establish effective treatment methods for sarcopenia in preventing falls in older adults.

Materials: A detailed literature review was conducted using the Scholar and PubMed databases for peer-reviewed articles published between 2020 and 2025. Systematic reviews, meta-analyses, and relevant clinical guidelines were included.

Conclusions: Sarcopenia is a significant, yet modifiable, risk factor for falls in older adults. Early diagnosis and symptom detection, combined with multifaceted therapeutic interventions can significantly reduce the number of falls, improve quality of life, and reduce healthcare costs.

KEYWORDS

Sarcopenia, Falls, Aging, Older Adults

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Introduction

Sarcopenia is a disease characterized by a loss of muscle mass and function, which particularly affects older people. Given the aging structure of most European societies, this is a serious problem that requires special attention. Furthermore, sarcopenia leads to a loss of independence, and consequently, to decreased well-being and feelings of loneliness. Sarcopenia has also been associated with an increased risk of mortality [1].

Definition

The concept of sarcopenia first appeared in 1988, coined by Irwin Rosenberg. He defined sarcopenia as an age-related decline in muscle mass. In 2001, the definition of sarcopenia was expanded to include a decline in muscle strength, not just muscle mass as before. Since then, sarcopenia has been defined as an age-related decline in both muscle mass and strength. In 2010, the European Working Group on Sarcopenia (EWGSOP) proposed a further expansion of the definition [2]. Currently, the most commonly used definition of sarcopenia is that recommended by EWGSOP, which was updated as EWGSOP2 in 2019.

Epidemiology

Risk factors for sarcopenia include: high body mass index (BMI), physical inactivity, sleep disorders, active smoking, diabetes, osteoporosis, nutritional disorders, depression, anorexia, Parkinson's disease, and cardiovascular disease [3]. It is estimated that sarcopenia affects between 10% and 16% of people aged 60 and older, depending on the diagnostic criteria and population. In turn, in people aged 80 and older, in some regions of the world (e.g., China), this percentage rises to above 40% [4]. Meta-analytic data indicate that the risk of falling in individuals with sarcopenia is 60-89% higher (depending on the factors considered) compared to their peers without sarcopenia [5].

Mechanisms of increased fall risk

From a pathophysiological perspective, the risk of falls is determined by factors such as reduced muscle strength and power (especially in the lower limbs), poorer postural control, and a slower response to balance disturbances. Sarcopenia often coexists with frailty syndrome, malnutrition, vitamin D deficiency, and multi-medication and multi-morbidity, which further increase the risk of falls. Global fall prevention guidelines recommend a thorough assessment of modifiable risk factors and multi-faceted intervention, tailored to individual risk factors as much as possible [6].

The Importance of Early Diagnosis

Publicly available articles and analyses demonstrate that screening tests can detect sarcopenia at an early stage. Increasing the diagnosis rate may impact the effectiveness of therapeutic processes [7]. There are simple screening tests that can be performed, for example, in primary care clinics. One such test is the SARC-F (Strength, Assistance with walking, Rise from a chair, Climb stairs, and Falls) test. However, a standardized and coordinated screening system is lacking. Such a system should include:

1. Annual SARC-F screening for individuals ≥ 65 years of age.
2. Verification of results using HGS and functional tests.
3. Prompt implementation of exercise and nutritional corrections.
4. Education of the patient and their family on fall prevention.

Diagnosis and Confirmation

Screening

Identifying individuals at risk is an important part of the diagnosis. Various questionnaires can be used to conduct this process. SARC-F (Strength, Assistance with Walking, Rising from a Chair, Climbing Stairs, and Falls) is a simple questionnaire that includes questions about strength, transferring indoors, transferring from a chair or bed, climbing stairs, and a history of falls. The subject can receive a score of 10. Sarcopenia is likely if the patient scores 4 points [8]. Its advantage is its simplicity and applicability in primary care or long-term care.

Muscle Strength Assessment

To assess muscle strength in the diagnosis of sarcopenia, handgrip strength is most commonly measured using a dynamometer. Handgrip strength correlates with the strength of other muscle groups in the body. The "Chair Stand" test assesses lower limb strength, primarily the strength of the quadriceps femoris. It can be

performed in two ways: by measuring the time required to stand up from a chair five times without using the hands, or by measuring the number of times a person stands up from a chair in 30 seconds. Both proposed diagnostic tests are inexpensive and quick to perform, and their results are good predictors for assessing the risk of falls [9].

Muscle Mass Assessment

The gold standard for non-invasive muscle mass assessment is magnetic resonance imaging or computed tomography, but these tests are expensive. A more commonly used test for assessing muscle mass is dual-energy X-ray absorptiometry (DXA), which provides information on lean body mass, body fat mass, and bone mineral content. This allows for the calculation of a muscle mass index [10]. An alternative method is bioimpedance analysis (BIA). This test estimates muscle mass based on whole-body electrical conductivity.

Physical Performance Assessment

To assess physical performance, we can use the gait speed test, the Timed Up & Go (TUG) [11], Short Physical Performance Battery (SPPB) [12] and many others, which allow us to determine functional capacity and predict the risk of falls. Assessing gait speed indirectly contributes to the overall assessment of physical fitness, and the test is typically conducted over a distance of 4 meters. According to the EWGSOP2 guidelines, a gait speed of <0.8 m/s is an indicator of severe sarcopenia. This is the simplest and quickest tool available in a clinical setting.

All of the steps described above are directly related to the proposed EWGSOP2 model for screening and diagnosing sarcopenia, defined as F-A-C-S: Find cases-Assess-Confirm-Severity.

1. Find cases: The first step involves screening using the SARC-F questionnaire.
2. Assess: The second step involves performing a handshake test or a chair rise test for assessment.
3. Confirm: The third step involves confirming the diagnosis by assessing muscle mass, for example, using DXA.
4. Severity: The fourth step involves assessing the severity of sarcopenia [9].

Treatment

Physical Exercise

This is the first-line treatment for sarcopenia. Resistance exercises, using body weight, resistance bands, or free weights, are most effective for patients with sarcopenia. Due to the increased risk of falls in individuals with sarcopenia, it is important to include balance exercises and aerobic training in the exercise program. The selection of exercises and physical activity should be based on the principle of specificity. The prescribed exercises must closely match the patient's needs, taking into account weakened muscle groups. For example, if a patient has difficulty getting up from a chair, the goal of the exercises should be to strengthen the muscles responsible for getting up from a chair. Additionally, it is important to increase muscle adaptation to increasingly heavier loads, which is achieved by gradually increasing the weight of the exercises. The standard should be two resistance training sessions per week for older adults. However, it's worth noting that in individuals with sarcopenia, two resistance training sessions per week may not be appropriate due to low muscle mass and low endurance. In such individuals, even one resistance training session per week can contribute to health improvement; the number of training sessions should gradually increase. Exercises should focus on both the upper and lower body and should be tailored to the individual needs of the patient. The training program should be carefully selected by a specialist, such as a physiotherapist [13].

Nutrition Optimization

Aging-related chronic inflammation, mitochondrial dysfunction, and macroautophagy disorders have been reported among individuals with sarcopenia. A balanced diet, rich in all essential macro and micronutrients, is crucial in halting the processes leading to sarcopenia, and when multifaceted therapeutic measures are implemented, symptoms may even regress [14]. It is common for older people to reduce their food intake with age [15]. General recommendations include a daily intake of 30 kcal/kg of body weight and a protein intake of 1.0 g/kg of body weight. It is recommended to divide the daily protein requirement into approximately 25-30 g per meal. It is advisable to choose protein enriched with amino acids such as leucine or arginine. Adequate hydration is also important – 1.6 to 2.0 l of water per day [14]. Supplementation is also important, including creatine, vitamin D, calcium, vitamin B12, and others. Creatine supplementation has been shown to contribute to increased lean body mass and muscle strength when combined with strength training

[16]. Vitamin D levels between 40 and 94 nmol/L have been found to correlate with faster walking speed and better chair-rise test results than those with vitamin D levels <40 nmol/L [14]. The recommended dose of vitamin D ranges from 1000 to 4000 IU per day for people over 65 years of age [17].

Modifying environmental factors

The risk of falls among older adults is increased if they have sarcopenia. Everyday objects can pose a risk to older adults [18]. Modifying environmental factors includes removing thresholds, securing carpets, installing grab bars in bathrooms and on stairs, improving lighting, and selecting appropriate footwear [19]. The issue of possible side effects of medications, which are predominantly taken by older adults, cannot be ignored. Medications for hypertension, antiarrhythmics, immunomodulators, psychotropic medications, and antibiotics are often used to treat conditions in the elderly. They can cause dizziness and a drop in blood pressure, which can contribute to falls [20].

Conclusions

Sarcopenia is a symptom complex that is becoming increasingly important in light of the aging social structures in most European countries. Sarcopenia is also a significant, yet modifiable, risk factor for falls in older adults. Early diagnosis and symptom detection, combined with multifaceted therapeutic interventions based on, among other things, dietary optimization, resistance training, education, and modification of environmental factors, can significantly reduce the number of falls, improve quality of life, and reduce healthcare costs.

Disclosure

Author's contribution:

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REFERENCES

1. Brown, J. C., Harhay, M. O., & Harhay, M. N. (2016). Sarcopenia and mortality among a population-based sample of community-dwelling older adults. *Journal of cachexia, sarcopenia and muscle*, 7(3), 290–298. <https://doi.org/10.1002/jcsm.12073>
2. Krzyżmińska-Siemaszkó, R. (2018) Sarkopenia 2018 – zaktualizowane kryteria diagnostyczne do diagnozowania niewydolności mięśni. *Geriatrics* 2018, 12, 227-234.
3. Yuan, S., & Larsson, S. C. (2023). Epidemiology of sarcopenia: Prevalence, risk factors, and consequences. *Metabolism: clinical and experimental*, 144, 155533.
4. Huang, J., He, F., Gu, X., Chen, S., Tong, Z., & Zhong, S. (2021). Estimation of sarcopenia prevalence in individuals at different ages from Zhejiang province in China. *Aging (Albany NY)*, 13(4), 6066.
5. Yeung, S. S. Y., Reijnierse, E. M., Pham, V. K., Trappenburg, M. C., Lim, W. K., Meskers, C. G. M., & Maier, A. B. (2019). Sarcopenia and its association with falls and fractures in older adults: A systematic review and meta-analysis. *Journal of cachexia, sarcopenia and muscle*, 10(3), 485–500.
6. Montero-Odasso, M., Van Der Velde, N., Martin, F. C., Petrovic, M., Tan, M. P., Ryg, J., ... & Masud, T. (2022). World guidelines for falls prevention and management for older adults: a global initiative. *Age and ageing*, 51(9), afac205.
7. Xie, W. Q., Xiao, G. L., Hu, P. W., He, Y. Q., Lv, S., & Xiao, W. F. (2020). Possible sarcopenia: early screening and intervention-narrative review. *Annals of Palliative Medicine*, 9(6), 4283293-4284293.
8. Malmstrom, T. K., Miller, D. K., Simonsick, E. M., Ferrucci, L., & Morley, J. E. (2016). SARC-F: a symptom score to predict persons with sarcopenia at risk for poor functional outcomes. *Journal of cachexia, sarcopenia and muscle*, 7(1), 28–36.
9. Cruz-Jentoft, A. J., Bahat, G., Bauer, J., Boirie, Y., Bruyère, O., Cederholm, T., ... & Zamboni, M. (2019). Sarcopenia: revised European consensus on definition and diagnosis. *Age and ageing*, 48(1), 16-31.
10. Guglielmi, G., Ponti, F., Agostini, M., Amadori, M., Battista, G., & Bazzocchi, A. (2016). The role of DXA in sarcopenia. *Aging clinical and experimental research*, 28(6), 1047–1060.
11. Martinez, B. P., Gomes, I. B., Oliveira, C. S., Ramos, I. R., Rocha, M. D., Forgiarini Júnior, L. A., Camelier, F. W., & Camelier, A. A. (2015). Accuracy of the Timed Up and Go test for predicting sarcopenia in elderly hospitalized patients. *Clinics (Sao Paulo, Brazil)*, 70(5), 369–372. [https://doi.org/10.6061/clinics/2015\(05\)11](https://doi.org/10.6061/clinics/2015(05)11)
12. Phu, S., Kirk, B., Bani Hassan, E., Vogrin, S., Zanker, J., Bernardo, S., & Duque, G. (2020). The diagnostic value of the Short Physical Performance Battery for sarcopenia. *BMC geriatrics*, 20(1), 242. <https://doi.org/10.1186/s12877-020-01642-4>
13. Hurst, C., Robinson, S. M., Witham, M. D., Dodds, R. M., Granic, A., Buckland, C., ... & Sayer, A. A. (2022). Resistance exercise as a treatment for sarcopenia: prescription and delivery. *Age and ageing*, 51(2), afac003.
14. Calvani, R., Picca, A., Coelho-Júnior, H. J., Tosato, M., Marzetti, E., & Landi, F. (2023). Diet for the prevention and management of sarcopenia. *Metabolism*, 146, 155637.
15. Wakimoto, P., & Block, G. (2001). Dietary intake, dietary patterns, and changes with age: an epidemiological perspective. *The journals of gerontology. Series A, Biological sciences and medical sciences*, 56 Spec No 2, 65–80.
16. Devries, M. C., & Phillips, S. M. (2014). Creatine supplementation during resistance training in older adults—a meta-analysis. *Medicine & Science in Sports & Exercise*, 46(6), 1194-1203.
17. Płudowski, P., Kos-Kudła, B., Walczak, M., Fal, A., Zozulińska-Ziółkiewicz, D., Sieroszewski, P., ... & Misiorowski, W. (2023). Guidelines for preventing and treating vitamin D deficiency: a 2023 update in Poland. *Nutrients*, 15(3), 695.
18. Petersson, I., Lilja, M., Hammel, J., & Kottorp, A. (2008). Impact of home modification services on ability in everyday life for people ageing with disabilities. *Journal of Rehabilitation Medicine*, 40(4), 253-260.
19. Dusińska, P., & Bonior, J. (2019). Wybrane czynniki ryzyka i prewencja upadków osób starszych. *Sztuka Leczenia*, 2, 33–38.
20. Rodrigues D, Silvestre S, Monteiro C, Duarte AP. Medication and the Risk of Falls: An Analysis of Adverse Drug Reactions Reported to the Portuguese Pharmacovigilance System. *J Clin Med*. 2023;12(23):7268. Published 2023 Nov 23.