Debate & Analysis

Sarcopenia:

why it matters in general practice

INTRODUCTION

Rosenberg introduced the term sarcopenia in the late 1980s from the Greek words 'sarx' (flesh) and 'penia' (lack/poverty) to describe an important change in body composition and function; a decline in lean body mass.[1] Questions arising at the time included whether this was a disease or part of the normal ageing process, or when it was that this decline reached a critical point to be considered a disease. In the last two decades there has been a growing research interest in this field, and sarcopenia was recognised as a disease in the 10th Edition of the International Classification of Diseases in 2016. Yet, a diagnosis of sarcopenia is very rarely made or documented in medical records; despite being a clinical entity, it is not acknowledged as one that deserves attention in general practice. This article aims to approach the topic of sarcopenia based on published guidelines and debate about its importance and challenges from a primary care perspective.

DEFINITION

A consensus on the definition and diagnosis of sarcopenia, initially published in 2010 by the European Working Group on Sarcopenia in Older People (EWGSOP),[2] defined sarcopenia as: '*... a syndrome characterised by progressive and generalised loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death.*' In 2018 the working group revised the definition.[3] In the revised EWGSOP2 guidelines, muscle strength (as opposed to muscle mass) comes to the forefront of defining sarcopenia. The criteria for diagnosis are:

1. low muscle strength;
2. low muscle quantity or quality; and
3. low physical performance.

When low muscle strength is detected, sarcopenia is probable. The additional presence of low muscle quantity or quality confirms the diagnosis of sarcopenia. When all three criteria are met, sarcopenia is considered severe.[3]

WHY DOES SARCOPENIA MATTER?

Sarcopenia is associated with reduced physical performance, impaired ability to perform activities of daily living,[4] increased risk of falls and fractures,[5] need for long-term care placement,[6] and increased mortality.[7] It can be either primary (age-related), when no specific cause can be found, or secondary when causal factors are identified (for example, low physical activity, inflammatory disease, organ failure, low intake, and/or malabsorption).[3]

A life-course approach to sarcopenia has been demonstrated by analysing normative data for grip strength across the life-course from UK studies,[8] showing a peak of muscle strength in early adulthood, followed by a plateau, and then a gradual decline. Interestingly, a reduction of grip strength ≥–2.5 standard deviation compared to young age has been shown to accurately describe a significant drop in muscle strength in a similar way as for defining osteoporosis in bone mineral density measurements.[8,9]

CASE FINDING AND ASSESSMENT

Screening for sarcopenia is not recommended because screening tools are not accurate and there is no proven effect on outcomes as a result of screening.[9] A case finding approach is advised instead.[3] EWGSOP2 guidelines recommend testing for sarcopenia when symptoms or signs are present, including frequent falls, feeling weak, slow walking speed, difficulty rising from a chair, weight loss, and muscle wasting.[3] An easy tool is the SARC-F questionnaire,[4] which is self-administered and consists of 5 items assessing strength (S), assistance in walking (A), rising from a chair (R), climbing stairs (C), and falls (F). An overall score of ≥4 is predictive of sarcopenia and poor outcomes (Box 1).

Muscle strength can be assessed by measuring grip strength using a handheld dynamometer.[3] The chair stand test can be used as a proxy for leg muscle strength. In this the patient is asked to sit in a chair that is at knee height, and then to stand from the chair. Patients who require use of their arms to stand are likely to have lower limb strength impairment.

Muscle quantity can be estimated by a variety of techniques, as total body skeletal muscle mass (SMM), appendicular skeletal muscle mass (ASMM) (sum of muscle masses of the four limbs), or in specific body sites, and results need to be adjusted to height and body mass index (BMI). Although magnetic resonance imaging (MRI) and computerised tomography (CT) are considered gold standard techniques to assess muscle quantity, the high cost and lack of portability restrict their use in clinical practice. Dual energy X-ray absorptiometry (DXA) is a gold standard method to estimate body composition; however, disadvantages include lack of portability and that results can be influenced by hydration status.[3] Bioimpedance analysis (BIA) derives an estimate of fat-free muscle mass based on electrical conductivity and using a conversion equation. BIA has the advantage of being portable and affordable, although

Box 1. SARC-F screen for sarcopenia[a]

Component	Question	Scoring
Strength	How much difficulty do you have in lifting and carrying 10 pounds?	None = 0 Some = 1 A lot or unable = 2
Assistance in walking	How much difficulty do you have walking across a room?	None = 0 Some = 1 A lot, use of aids, or unable = 2
Rise from a chair	How much difficulty do you have transferring from a chair or bed?	None = 0 Some = 1 A lot or unable without help = 2
Climb stairs	How much difficulty do you have climbing a flight of 10 stairs?	None = 0 Some = 1 A lot or unable = 2
Falls	How many times have you fallen in the past year?	None = 0 1–3 falls = 1 ≥4 falls = 2

[a]An overall score of ≥4 is predictive of sarcopenia and poor outcomes. Adapted from Malmstrom and Morley[11] with permission from Morley.

its accuracy may vary.[3] Ultrasound can be used for the assessment of muscle quantity and quality, and has good validity compared to DXA, MRI, and CT.[3]

Physical performance can be assessed by gait speed (considered slow when it takes >5 seconds to walk a distance of 4 metres). More composite measures of physical performance, such as the Short Physical Performance Battery (SPPB) and Timed Up and Go Test (TUGT),[3] can be difficult to employ in routine general practice.

MANAGEMENT

According to the International Clinical Practice Guidelines for Sarcopenia (ICFSR),[10] prescription of resistance-based training can be effective to improve muscle strength, skeletal muscle mass, and physical function in patients with sarcopenia (grade: strong recommendation; moderate certainty of evidence). ICFSR also recommend that clinicians consider protein supplementation or a protein-rich diet for older adults with sarcopenia (grade: conditional recommendation; low certainty of evidence). Nutritional intervention should be combined with a physical activity intervention, although the grade of the evidence is low.[10] Despite a number of trials investigating different hormones, vitamin D, and other pharmacological treatments, no specific drugs have been approved yet for the treatment of sarcopenia.

DISCUSSION

Sarcopenia is associated with adverse health outcomes and is therefore a condition that should be identified and managed. The SARC-F questionnaire can be administered for case ascertainment when an older person presents with frequent falls, weakness, weight loss, or muscle wasting. Based on EWGSOP2 guidelines, a positive result on SARC-F should trigger an assessment of muscle strength, quantity, and performance. The chair stand test can be used as a proxy to assess muscle strength, and gait speed may be assessed by observing the older person as they walk through the corridor of the surgery to come into the consulting room; however, the assessment of muscle quantity can be a challenge as the only portable instrument is BIA, which is rarely available in a generalist setting.

Another important symptom is involuntary weight loss, which is very common in patients with sarcopenia and is also one of the phenotypic characteristics of frailty. Although these are two distinct conditions (frailty is a syndrome and sarcopenia a disease), they share common features including low grip strength, slow gait speed, and weight loss. It is believed that sarcopenia contributes to physical frailty,[9] although there are other elements of frailty that are not related to muscle wasting. Sarcopenia is distinct from cachexia, which is typically associated with cancer, end-stage organ failure, or HIV/AIDS, and is mediated by mechanisms such as excess catabolism, inflammation, and endocrine changes, which are different to those described in sarcopenia.[9] There is also an overlap between sarcopenia and malnutrition as both can present with weight loss and reduced muscle mass, but reduced muscle strength is a criterion for the diagnosis of sarcopenia and not malnutrition. However, sarcopenia can also affect people who are overweight, in the context of excess adiposity and reduced lean body mass, with infiltration of fat into the muscle, a condition called sarcopenic obesity.[3]

In terms of interventions to treat sarcopenia, there is growing evidence on the effectiveness of resistance training exercise to improve muscle strength and muscle mass, whereas evidence about nutritional interventions is less consistent.[9,10] A combination of exercise and diet is currently recommended, although the level of certainty is low,[10] and larger, high-quality trials are needed.

Sarcopenia contributes to the vulnerability that defines the syndrome of frailty, and the above recommendations about exercise and adequate protein intake should be incorporated in the assessment and care planning of frail older people in the community. Moreover, the life-course approach to sarcopenia means that early interventions targeting middle-aged populations may have the potential to reduce the future risk of sarcopenia and adverse health outcomes. Therefore, it is sensible to include exercise and adequate, balanced nutrition in health promotion advice provided in everyday practice.

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