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Sarcopenia and frailty

Frailty and sarcopenia are common among older persons in residential aged care. It is estimated that 1 in 5 Australian adults aged 65 years and older are frail, with a further 48% identified as pre-frail. Sarcopenia increases from 14% in those aged above 65 years, to more than 50% in those aged 80 years and older. By the age of 70, up to half of muscle mass is lost, and often replaced with fat.

Sarcopenia is one of the most important causes of functional decline and loss of independence in older adults. Frailty and sarcopenia are associated with disability and increased care needs, increased risk of falls, reduced quality of life, higher hospitalisation rates and increased mortality.

Definitions

The World Health Organisation (WHO) defines frailty as *'a clinically recognizable state in older people who have increased vulnerability, resulting from age-associated declines in physiological reserve and function across multiple organ systems, such that the ability to cope with everyday or acute stressors is compromised.'*

Sarcopenia is a condition characterized by loss of skeletal muscle mass and function. The *European Working Group on Sarcopenia in Older People* defines sarcopenia as the presence of low skeletal muscle mass and either low muscle strength (e.g., handgrip) or low muscle performance (e.g., walking speed or muscle power); when all three conditions are present, severe sarcopenia may be diagnosed. Sarcopenia is considered a muscle disease that may be acute or chronic.

Loss in muscle mass may be associated with increased body fat. Sarcopenic obesity can occur despite normal weight and is associated with marked weakness.

It is important to distinguish sarcopenia from cachexia. Cachexia may be defined as a multifactorial syndrome characterized by severe body weight, fat and muscle loss and increased protein catabolism due to underlying disease.

Sarcopenic obesity

Sarcopenic obesity is the combination of obesity with low skeletal muscle mass and function. Functional limitations associated with sarcopenic obesity include slow walking, difficulty in rising from a chair without hands or walking up stairs.

Excess energy intake, physical inactivity, low-grade inflammation, insulin resistance and changes in hormonal homeostasis may result in the development of sarcopenic obesity.

Sarcopenic obesity is associated with accelerated functional decline and disability, and increased risks of cardiometabolic diseases, vitamin D deficiency, insulin resistance and mortality. Sarcopenic obesity may have a greater effect on metabolic disorders, cardiovascular disease and mortality than either obesity or sarcopenia alone.

Sarcopenic obesity can also increase the risk of cognitive impairment. Sarcopenia is significantly associated with dementia in women, but not in men.

Risk factors

Risk factors for sarcopenia include:

- Older age
- Gender
- Level of physical activity
- Nutrition

Reduced physical activity due to frailty may lead to loss of muscle mass, resulting in lower weight.

Low vitamin D levels may be associated with sarcopenia and low physical activity. Weight loss, either intentional or unintentional, can accelerate sarcopenia in older women.

Sarcopenia is associated with obesity, osteoporosis, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), type 2 diabetes and insulin resistance. Rheumatological conditions are highly associated with sarcopenia.

Older people with sarcopenia have a 60% increased risk of falls and a 70% higher chance of fractures. Sarcopenic obesity is associated with lower bone mineral density and a higher risk of non-vertebral fractures, compared with older people without sarcopenia, without obesity, and only obesity.

An increased risk of depression in people with sarcopenic obesity has been reported.

Symptoms

Symptoms of sarcopenia may include:

- Decreased muscle size
- Muscle weakness
- Loss of endurance
- Poor balance
- Trouble climbing stairs

Interventions

One of the first interventions for people with sarcopenia and frailty is to ensue correct and sufficient nutrition. Early satiety and reduced appetite are common among older people – the 'anorexia of ageing'. Nutritional supplements with high protein content may be warranted. Difficulty swallowing or dysphagia should result in referral to speech pathologist.

Physical activity, particularly resistance exercise, is a protective factor for the prevention and management of sarcopenia.

For sarcopenic obesity, a combination of resistance training and a normal or high protein hypocaloric diet may improve muscle strength, endurance, aerobic capacity, balance and functional capacity.

Medications

Medication reviews can identify medicines that impact on appetite and food intake, such as dry mouth, anorexia, gastro-oesophageal reflux disease (GORD), and gastritis. Constipation can impact on appetite and should be proactively managed. Stimulant laxatives will be appropriate for most people prescribed opioids.

Menopausal hormone therapy (MHT) (formerly called hormone replacement therapy) has been shown to prevent the loss of lean body mass and may also increase it. MHT may also decrease abdominal fat mass. It should be noted that MHT should not be commenced at older age, more than 10 years post-menopause due to an unfavourable risk-benefit profile.

Supplementation with vitamin D is associated with increased skeletal muscle mass in people who are vitamin D deficient.

Soy isoflavones may be improve lean mass in post-menopausal women.

Testosterone use in men is controversial. Whilst testosterone supplements increase muscle mass and strength, they are associated the an increased risk of cardiovascular adverse events and an increased risk of benign prostate hyperplasia and prostate cancer. In addition, any benefits are not maintained after discontinuation of treatment.

Pain management should be optimised to enable participation in exercise programs and resistance training. NSAIDs may delay the onset of sarcopenia and slow the progression of muscle loss. However, gastrointestinal and cardiovascular side effects limit use of NSAIDs long-term.

Metformin may improve the resistance training response by lowering inflammation.

Summary

Sarcopenia is a condition characterized by the progressive loss of muscle mass and strength or physical function that occurs with aging. It is one of the most important causes of functional decline and loss of independence in older people. Age-associated increases in visceral fat and reduced muscle mass are associated with multiple adverse cardiometabolic effects and poorer health outcomes. Loss of muscle mass contributes to frailty and an increased risk of falls. Ideally, sarcopenia should be prevented through physical activity and resistance training, together with adequate nutrition.

References

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