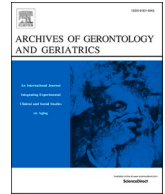


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## Sarcopenia Is Essential in the Chronic Condition Management

## ARTICLE INFO

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Sarcopenia is defined as an age-related condition featured by the loss of muscle mass plus low muscle strength or/and low physical performance (Cruz-Jentoft, et al., 2010; Chen, et al., 2014; Cruz-Jentoft, et al., 2019; Chen, et al., 2020). Although the diagnostic criteria of sarcopenia have been widely used in research and clinical settings, applying diagnostic algorithms among older persons with multiple complex conditions is still challenging. The revised consensus report of the European Working Group on Sarcopenia in Older People (EWGSOP2) proposed primary and secondary sarcopenia to differentiate sarcopenia of different patho-etiology (Cruz-Jentoft, et al., 2019); moreover, EWGSOP2 also proposed acute and chronic sarcopenia to define sarcopenia with different clinical course. However, the 2019 consensus report of the Asian Working Group for Sarcopenia (AWGS 2019) did not specifically address these issues because of the lack of sufficient supporting evidences from Asian countries. Nevertheless, 2019 AWGS did strongly recommend adding sarcopenia to care plans of age-related chronic conditions in all health care settings (Chen, et al., 2020). In the pathophysiology, sarcopenia and most age-related chronic conditions did share similar risk factors, and they may synergistically generate adverse effects to health of older people. Maintaining sufficient protein intake is essential to improve muscle mass and muscle quality (Peng, et al., 2021), but high-protein diet (especially animal protein) significantly increased cardiovascular risk (Zhang, et al., 2020; Peng et al., 2021). A previous study has indicated that higher protein density with fixed daily calorie intake was effective in preventing myocardial infarction (Prentice, et al., 2011), but the potential benefit may mainly come from the control of daily calorie instead of dietary protein density alone. Another challenge of protein intake for older adults is the concerns of renal function impairment in chronic kidney disease (Bauer, et al., 2013), and clinicians of different specialties may practice differently regarding to the optimal daily protein intake for older persons with chronic kidney disease.

To reduce the difficulties of sarcopenia diagnosis in the community settings, the 2019 AWGS consensus report defined “possible sarcopenia”

that requires no muscle mass measurement to enable holistic care planning for older adults in primary health care settings or preventive services (Chen, et al., 2020). Although “possible sarcopenia” does not measure muscle mass, it well captures the risk of sarcopenia in older adults (Ueshima, et al., 2021), and serves to be a candidate outcome indicator for community-based health promotion activities (Merchant, et al., 2021). “Possible sarcopenia” satisfies the purpose of promoting sarcopenia prevention and management for older adults in the communities and should be more actively engaged in the chronic condition management. The previous report has affirmed the clinical significance of integrated care for older adults (Akpan, et al., 2018), and the integration of intensive lifestyle modifications and multimorbidity management has demonstrated its clinical excellence as an example of high-value practice model (Lee, et al., 2020). Lifestyle-based sarcopenia prevention or management is the essential element of healthy aging across the life-course in people with different functional ability (Beard, et al., 2016), either as an independent condition or incorporated with other chronic conditions.

The EWGSOP2 and AWGS 2019 both modified the diagnostic algorithms to enable sarcopenia diagnosis in various health care settings. The prevalence of sarcopenia diagnosed by EWGSOP2 became lower after modifications of the diagnostic algorithm and cutoffs (Van Ancum et al., 2020), but it was higher by using the AWGS 2019 criteria (Kim and Won, 2020). A study comparing sarcopenia diagnosed by EWGSOP and EWGSOP2 showed a significant discordance (Villani, et al., 2020); the AWGS 2019 not only identified a higher prevalence of sarcopenia, but also demonstrated associations between sarcopenia and cardiovascular risk (Tabara, et al., 2020). A previous report has shown the associations between sarcopenia and systemic inflammation (Zhao et al., 2021), and these associations were presented by multiple inflammatory biomarkers of different mechanisms (Yoon et al., 2020). Moreover, consuming foods with pro-inflammatory properties substantially increased the risk of sarcopenia (Son, et al., 2021), which also increased the risk of atherosclerosis and cardiovascular diseases. Among older persons with

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cardiovascular diseases and possible sarcopenia, the interaction between nutritional status, leisure activities and resilience suggested the potential benefits of integrated care planning of sarcopenia management in older adults with cardiovascular diseases (Lee, et al., 2021). A systematic review examined associations between dementia and sarcopenia has shown positive but heterogeneous associations between two conditions (Waite et al., 2021). Inoue, et al, successfully used calf circumference to identify sarcopenia among stroke patients with impaired mobility abilities (Inoue, et al., 2021). In older patients with congestive heart failure, sarcopenia has been shown to be an independent risk factor for adverse cardiac events in a outpatient-based cohort study (Nozaki, et al., 2019). In cancer research, the prevalence, associated factors, and prognostic significance of sarcopenia have been widely reported and played certain therapeutic implications (Yang, Shen, Tan & Li, 2019; Aleixo, et al., 2020). In addition to individual diseases, sarcopenia is also highly prevalent in older adults with multiple complex care needs. Among 499,096 UK Biobank participants, common chronic conditions associated with probable sarcopenia included musculoskeletal/trauma, endocrine/diabetes, and neurological/psychiatric conditions, whereas a half of participants with probable sarcopenia had multimorbidity (Dodds, et al., 2020). The associations between sarcopenia and multimorbidity suggested the potential linkage with polypharmacy, but the presence of sarcopenia was independent of polypharmacy in older adults (Agosta, et al., 2019). The discrepancy may be explained by the heterogeneity of multimorbidity and the co-existence may not be causal or sequential effects.

A recent study from Thailand reported better accuracy of quadriceps strength than handgrip strength in sarcopenia diagnosis (Assantachai, et al., 2021); moreover, the performance of chair-rise test was associated with muscle mass and may be the assessment tool for both muscle mass and physical performance in sarcopenia diagnosis (Yoshiko, et al., 2021). These studies aimed to develop simple assessment in sarcopenia diagnosis in different scenarios to accelerate the intervention programs. Muscle ultrasound has been introduced to quantify muscle mass in sarcopenia diagnosis (Ticinesi, et al., 2017; Cruz-Jentoft, et al., 2019), which still needs more research efforts to reach diagnostic consensus. On the other hand, visceral fat thickness determined by the bioimpedance analysis was found positively correlated with skeletal muscle mass (Bahşi, et al., 2021), and may also play certain roles in sarcopenia diagnosis. The afore-mentioned studies clearly demonstrated the growing interest of clinicians of different backgrounds in sarcopenia diagnosis and treatment. Research efforts for the molecular mechanisms, etiology, pathophysiology, non-pharmaceutical or pharmaceutical management for sarcopenia are important, but adding sarcopenia to the holistic care planning for older people with chronic conditions is also critical to promote healthy longevity.

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