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Editorial

Integrated Care to Optimize the Management of Sarcopaenia and Chronic Obstructive Pulmonary Disease

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In 1988, Irwin Rosenberg [1] described the degenerative, age-related loss of skeletal muscle mass, quality, and function as "sarcopaenia" from the Greek ("*sarx*" for flesh and "*penia*" for loss or "poverty of the flesh"). By providing a clear definition of this phenomenon, it leads to increased research to appropriately classify patients and examine the underlying pathology of the disease. In 1998, Richard Baumgartner defined sarcopenia as appendicular skeletal muscle mass (measured by dual-energy X ray absorption) / height^2 of being less than two standard deviations below the mean of young healthy adults (analogous to the T score when measuring bone mineral density) and estimated the prevalence to be 13–24% in 60–70-year-olds and over 50% in older individuals >80 years of age [2].

In 2010, the European Working Group on Sarcopenia in Older People (EWGSOP) proposed a practical clinical definition of age-related sarcopenia as "a syndrome characterized by progressive and generalized loss of skeletal muscle mass and function (strength or performance) with a risk of adverse outcomes such as physical disability, poor health-related quality of life and death" [3]. The EWGSOP has emphasized that sarcopenia is a geriatric syndrome [4]. This concept promotes the identification and treatment of sarcopenia even when the exact cause of the syndrome remains unknown. The following evidence in regard to sarcopenia support the current definition as a geriatric syndrome; 1) sarcopenia is prevalent in aging populations, 2) sarcopenia is linked to multiple contributing factors including the aging process itself, genetic susceptibility, certain life habits (e.g., a sedentary lifestyle), changes in living conditions (e.g., bed rest), a number of chronic illnesses (e.g., COPD), certain drug treatments, and 3) sarcopenia is often associated with poor outcomes such as mobility disorders, disability, poor health related quality of life and mortality.

The EWGSOP developed an algorithm based on gait measurements, speed, grip strength, and muscle mass to diagnosis and screen sarcopaenia in clinical practice. The "sarcopenia" stage is characterized by low muscle mass, and low (physical) strength or low physical performance. "Severe sarcopenia" is the stage in which all three criteria are met. Low muscle mass that does not impact on strength or physical performance is categorized as "pre-sarcopenia". Muscle function does not depend solely on muscle mass and the relationship between function and mass is not linear, thus sarcopenia defined in terms of muscle mass only may be of limited clinical value.

In elderly patients with chronic obstructive pulmonary disease (COPD), whose exercise intolerance is an important disabling feature of the disease, the loss of skeletal muscle mass and function is a particular problem [5], which is categorized as "secondary sarcopenia" within the scope of the EWGSOP definition. However, the aetiology of sarcopenia is multi-factorial [3] and age-related sarcopenia occurs simultaneously [5], thus it may be unnecessary to distinguish strictly between primary (age-related disease) from secondary conditions. A graph depicting age-related declines in muscle mass and strength as accelerated by sarcopenia [6] is ominously similar to a graph describing the accelerated decline in lung function with smoking or COPD [7], which may suggest both conditions share common underlying mechanisms and risk factors. Therefore, considering sarcopenia in elderly COPD patients as a multi-faceted geriatric syndrome may allow for the implementation of specific multiple risk factor assessments (i. e. comprehensive geriatric assessments) and new practical and public-health approaches [4].

Skeletal muscle dysfunction in COPD was investigated as a remediable source of exercise intolerance in pulmonary rehabilitation and the evidence was summarized in 1999 by the American Thoracic Society (ATS) and the European Respiratory Society (ERS) [8]. Muscle performance, as measured by a timed walking (distance) test was an important predictor of survival [9]. In the early 21st century, COPD was recognized as a chronic systemic inflammatory syndrome [10] and main systemic effects or co-morbidities associated with the disease commonly include skeletal muscle abnormalities. This has also led to the recognition that elders are in need of care, and has given rise to the concept of geriatric syndrome: #1. Increased awareness and a comprehensive diagnostic approach to chronic co-morbidities should be promoted. #2. From a public-health perspective, lifestyle modifications to multiple risk factors should be developed as preventive and prophylactic approaches to the disease [10].

The following findings indicate the clinical significance of sarcopenia in COPD: Muscle mass in COPD patients, particularly in the lower limbs [11], is reduced and reduced muscle mass is a predictor of mortality [12]. In COPD, shifts in peripheral muscle fiber types (myo-pathological changes analyzed with immunohistochemistry) relate to disease severity [13] and health status [14]. Moreover, quadriceps weakness exists in COPD patients without severe airflow obstruction or breathlessness and the prevalence of quadriceps weakness is related to the severity of COPD [15]. Quadriceps strength in COPD patients is a predictor of physical functioning [16], health care utilization [17] and mortality, without the contribution of total body muscle mass [18]. These results suggest that muscle quality

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rather than quantity seems to be more important in the prognosis of COPD [5], which is in accordance with the EWGSOP definition of sarcopenia.

The link between muscle strength and prognosis implicates the possibility to reduce disability and mortality in COPD by focusing on interventions that improve muscle function [5], i. e. comprehensive pulmonary rehabilitation with a stress on nutritional support, or "nutritional rehabilitation [19]". In 2013, the official statement on pulmonary rehabilitation of the ATS and the ERS was revised to highlight the complex nature of COPD, with its multi-systemic manifestations and frequent chronic systemic inflammatory co-morbidities [20]. The official statements adopted "integrated care" [21] principles to optimize and maintain benefits and referred to pulmonary rehabilitation as core components of "integrated care". Integrated care is defined as a continuum of individualized, patient-centered approaches that integrate medical care among healthcare professionals and across healthcare sectors to achieve optimal daily functioning, health status and independence throughout the course of the disease [22]. In an integrated care setting, interventions are escalated in a stepwise fashion from simple self-management techniques that require minimal action to more complex techniques. Disease management varies according to the complexity required by patients and health behaviour changes are made by enhanced self-efficacy using cognitive behavioral techniques to sustain health status improvements [21].

It is time to establish an integrated care system for elderly COPD patients with comprehensive geriatric assessments that adopt the EWGSOP definition of sarcopenia. Sarcopenia in COPD should not only be regarded as a co-morbidity of chronic systemic inflammation but also as a geriatric syndrome.

References

1. Rosenberg IH. Sarcopenia: origins and clinical relevance. J Nutr. 1997; 127: 990S-991S.
2. Baumgartner RN, Koehler KM, Gallagher D, Romero L, Heymsfield SB, Ross RR, et al. Epidemiology of sarcopenia among the elderly in New Mexico. Am J Epidemiol. 1998; 147: 755-763.
3. Cruz-Jentoft AJ, Baeyens JP, Bauer JM, Boirie Y, Cederholm T, Landi F, et al. Sarcopenia: European consensus on definition and diagnosis: Report of the European Working Group on Sarcopenia in Older People. Age Ageing. 2010; 39: 412-423.
4. Cruz-Jentoft AJ, Landi F, Topinková E, Michel JP. Understanding sarcopenia as a geriatric syndrome. Curr Opin Clin Nutr Metab Care. 2010; 13: 1-7.
5. Steiner MC. Sarcopaenia in chronic obstructive pulmonary disease. Thorax. 2007; 62: 101-103.
6. Sayer AA, Syddall H, Martin H, Patel H, Baylis D, Cooper C. The developmental origins of sarcopenia. J Nutr Health Aging. 2008; 12: 427-432.
7. Fletcher C, Peto R. The natural history of chronic airflow obstruction. Br Med J. 1977; 1: 1645-1648.
8. Skeletal muscle dysfunction in chronic obstructive pulmonary disease. A statement of the American Thoracic Society and European Respiratory Society. Am J Respir Crit Care Med. 1999; 159: S1-40.
9. Gerardi DA, Lovett L, Benoit-Connors ML, Reardon JZ, ZuWallack RL. Variables related to increased mortality following out-patient pulmonary rehabilitation. Eur Respir J. 1996; 9: 431-435.
10. Fabbri LM, Rabe KF. From COPD to chronic systemic inflammatory syndrome? Lancet. 2007; 370: 797-799.
11. Marquis K, Debigaré R, Lacasse Y, LeBlanc P, Jobin J, Carrier G, et al. Midthigh muscle cross-sectional area is a better predictor of mortality than body mass index in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2002; 166: 809-813.
12. Schols AM, Broekhuizen R, Weling-Scheepers CA, Wouters EF. Body composition and mortality in chronic obstructive pulmonary disease. Am J Clin Nutr. 2005; 82: 53-59.
13. Gosker HR, Zeegers MP, Wouters EF, Schols AM. Muscle fibre type shifting in the vastus lateralis of patients with COPD is associated with disease severity: a systematic review and meta-analysis. Thorax. 2007; 62: 944-949.
14. Montes de Oca M, Torres SH, Gonzalez Y, Romero E, Hernández N, Mata A, et al. Peripheral muscle composition and health status in patients with COPD. Respir Med. 2006; 100: 1800-1806.
15. Seymour JM, Spruit MA, Hopkinson NS, Natanek SA, Man WD, Jackson A, et al. The prevalence of quadriceps weakness in COPD and the relationship with disease severity. Eur Respir J. 2010; 36: 81-88.
16. Steiner MC, Singh SJ, Morgan MD. The contribution of peripheral muscle function to shuttle walking performance in patients with chronic obstructive pulmonary disease. J Cardiopulm Rehabil. 2005; 25: 43-49.
17. Decramer M, Gosselink R, Troosters T, Verschueren M, Evers G. Muscle weakness is related to utilization of health care resources in COPD patients. Eur Respir J. 1997; 10: 417-423.
18. Swallow EB, Reyes D, Hopkinson NS, Man WD, Porcher R, Cetti EJ, et al. Quadriceps strength predicts mortality in patients with moderate to severe chronic obstructive pulmonary disease. Thorax. 2007; 62: 115-120.
19. Schols AM. Nutritional rehabilitation: from pulmonary cachexia to sarcoPD. Eur Respir J. 2009; 33: 949-950.
20. Spruit MA, Singh SJ, Garvey C, ZuWallack R, Nici L, Rochester C, et al. An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. Am J Respir Crit Care Med. 2013; 188: e13-64.
21. Wagg K. Unravelling self-management for COPD: what next? Chron Respir Dis. 2012; 9: 5-7.
22. Nici L, ZuWallack R; American Thoracic Society Subcommittee on Integrated Care of the COPD Patient. An official American Thoracic Society workshop report: the Integrated Care of The COPD Patient. Proc Am Thorac Soc. 2012; 9: 9-18.

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