THE GERONTOLOGICAL SOCIETY OF AMERICA®

Journals of Gerontology: Medical Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2017, Vol. 72, No. 11, 1575–1581
doi:10.1093/gerona/glw343
Advance Access publication January 21, 2017

OXFORD

Research Article

Prevalence and Clinical Correlates of Sarcopenia, Identified According to the EWGSOP Definition and Diagnostic Algorithm, in Hospitalized Older People: The GLISTEN Study

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Received August 10, 2016; Editorial Decision Date December 15, 2016

Decision Editor: Stephen Kritchevsky, PhD

Abstract

Background: Prevalence of sarcopenia is substantial in most geriatrics settings, but estimates vary greatly across studies because of difference in population characteristics, diagnostic criteria, and methods used to assess muscle mass, muscle strength, and physical performance. We investigated the feasibility of the European Working Group on Sarcopenia in Older People (EWGSOP) algorithm assessment in hospitalized older adults and analyzed prevalence and clinical correlates of sarcopenia.

Methods: Cross-sectional analysis of 655 participants enrolled in a multicenter observational study of older adults admitted to 12 acute hospital wards in Italy. Sarcopenia was assessed as low skeletal mass index (kg/m^2) plus either low handgrip strength or low walking speed (EWGSOP criteria). Skeletal muscle mass was estimated using bioimpedance analysis.

Results: Of the 655 patients (age 81.0 ± 6.8 years; women 51.9%) enrolled in the study, 275 (40.2%) were not able to perform the 4-m walking test because of medical problems. The overall prevalence of sarcopenia on hospital admission was 34.7% (95% confidence interval 28–37) and it steeply increased with aging ($p < .001$). In multivariable analysis, patients with sarcopenia on hospital admission were older and were more likely to be male and to have congestive heart failure, cerebrovascular disease, and severe basic activities of daily living disability. The prevalence of sarcopenia was inversely correlated with body mass index.

Conclusion: Based on EWGSOP criteria, prevalence of sarcopenia is extremely high among older adults on admission to acute hospital wards. Older age, male gender, congestive heart failure, cerebrovascular disease, severe activities of daily living disability, and body mass index were the clinical variables significantly associated with the presence of sarcopenia.

Keywords: Sarcopenia—Prevalence—Hospital—Acute care

The aging process is often characterized by substantial changes in body composition, including increase in fat mass and loss of skeletal muscle mass, resulting in loss of muscle strength and function, a condition that has been referred to as sarcopenia (1). Sarcopenia is therefore considered a geriatric syndrome defined as a progressive impairment of muscle function due to the loss of skeletal muscle mass that occurs with advancing age (2). In older people, sarcopenia is a powerful risk factor for mobility impairment, disability, loss of independence, hospitalization, and death (3). The clinical implications of this geriatric syndrome have been reported consistently across different settings, including community-dwelling samples, nursing homes, and acute care departments (4).

According to a recent systematic review (4), prevalence of sarcopenia is substantial in most geriatrics settings, but estimates vary greatly across studies because of different population characteristics, diagnostic criteria, and heterogeneous methods used to assess muscle mass, muscle strength, and physical performance. When assessed according to the European Working Group on Sarcopenia in Older People (EWGSOP) criteria (5), prevalence rates ranged from 1% to 29% among community-dwelling populations (6,7) and from 17.4% to 32.8% among institutionalized older people (8,9).

Previous studies have reported that sarcopenia is associated with increased risk of hospitalization (3) and poor clinical outcomes following acute illness, including longer length of hospital stay (10) and increased risk of death (11). Hospitalization, in turn, represents a stressful and potentially hazardous event for older persons; indeed, besides the detrimental effect of the acute event, hospitalization itself might represent an additional risk factor for sarcopenia and functional decline because of reduced caloric intake, low physical activity or prolonged bed-rest, depressed mood, and social isolation. From this point of view, identification of patient with sarcopenia at hospital admission might be important to avoid further decline in muscle mass and physical function. Nevertheless, data on hospitalized patients are scant and limited to small single-center studies (12,13). Furthermore, the feasibility of standardized assessment of the diagnostic criteria for sarcopenia, including objective measures of physical performance, in the geriatric acute setting has not been evaluated in large samples.

We conducted therefore a multicenter cross-sectional study of older patients admitted to 12 acute care wards in Italy. The primary objective of this report was to estimate both the prevalence at hospital admission and the clinical correlates of sarcopenia defined according to EWGSOP criteria. Furthermore, we sought to investigate the feasibility of the EWGSOP algorithm assessment in a large sample of hospitalized older patients.

Methods

Study Design and Data Collection

Data are from the Gruppo di Lavoro Italiano Sarcopenia – Trattamento e Nutrizione (GLISTEN) project, an observational study performed in geriatric and internal medicine acute care wards of 12 Italian hospitals (see Supplementary Appendix). The study was designed to investigate prevalence and clinical correlates of sarcopenia in older hospitalized adults in Italy and to estimate incidence of sarcopenia during hospital stay. All patients consecutively admitted to participating wards, between February 2014 and May 2014, were screened for enrollment. Exclusion criteria were: age younger than 65 years and patient's unwillingness to take part in the study. All participants were assessed within the first 48 hours from hospital admission and again at discharge. All participating centers obtained ethical approval from their institutions, and all participants signed a written consent.

Participants' data were collected through a standardized dedicated questionnaire including demographic characteristics, self-report functional status, cognitive, and mood assessment; medications use; incident and prevalent medical conditions; and results of biochemical tests.

The questionnaire was filled within the first 48 hours from hospital admission and again within 24 hours before hospital discharge. Questionnaires were filled using a variety of information sources, such as direct observation, interviews with the patients, family, friends or formal service providers, and review of clinical records, both medical and nursing. Furthermore, objective measurers of muscle mass (bioimpedance analysis [BIA]) and physical performance (handgrip strength and 4-m usual walking speed test) were also assessed at the same time points.

Assessment of Sarcopenia

According to EWGSOP criteria, sarcopenia was defined as presence of low muscle mass, plus low muscle strength, or low physical performance (5). Muscle mass was measured by BIA using a Quantum/S Bioelectrical Body Composition Analyzer (Akern Srl, Florence, Italy). Whole-body BIA measurements were taken between the right wrist and ankle with subject in a supine position. Muscle mass was calculated using the BIA equation of Janssen and colleagues (14): Skeletal muscle mass (kg) = ([height^2/BIA resistance × 0.401] + [gender × 3.825] + [age × −0.071]) + 5.102, where height is measured in centimeters; bioelectrical impedance analyses resistance is measured in ohms; for gender, men = 1 and women = 0; age is measured in years. This BIA equation was previously developed and cross-validated against magnetic resonance imaging measures of whole-body muscle mass (15). Absolute skeletal muscle mass (kg) was converted to skeletal muscle index (SMI) standardizing by meters squared (kg/m^2) (15). Using the cutoff points indicated in the EWGSOP consensus, low muscle mass was classified as SMI less than 8.87 and 6.42 kg/m^2 in men and women, respectively. Muscle strength was assessed by grip strength, measured using a hand-held dynamometer (JAMAR hand dynamometer, Model BK-7498, Fred Sammons Inc., Brookfield, IL). Three trials for each hand were performed and the highest value of the strongest hand was used in the analyses (16). Body mass index (BMI)-adjusted values were used as the cutoff point to identify low muscle strength (5). Usual walking speed (m/s) on a 4-m course was used as an objective measure of physical performance; speed lower than 0.8 m/s identified participants with low physical performance. Two hundred seventy-five patients did not perform the walking test.

Of them, 134 were not able to walk in the 2 weeks preceding hospital admission and were therefore classified as having low physical performance; the remaining 141 reported independent activities of daily living (ADL) mobility status and were thus considered as having normal gait speed if they have an available grip strength assessment. Fourteen patients lacking either the grip strength or the gait speed evaluation were excluded from the analysis, leaving a final sample of 655 patients (Figure 1).

Covariates

Sociodemographic variables (age, gender, smoking habit, education) were assessed from clinical interview at hospital admission. Functional status in basic ADL was measured according to the participants' self-reported difficulty in performing each of six activities: getting in and out of a bed, bathing, dressing, eating, continence, and using the toilet. Severe ADL disability was defined as the presence of difficulty in three or more activities (17). Cognitive functioning was assessed using the Short Portable Mental Status Questionnaire (SPMSQ) (18): patients with three or more errors were considered as cognitively impaired. Mood status was assessed with the 15-item version of the Geriatric Depression Scale, with scores more than 5/15 suggesting the presence of depressive symptoms (19).

Diagnoses of specific medical conditions were gathered from the patient, attending physicians, and by a careful review of medical charts; comorbidity was assessed using the Charlson Comorbidity Index by adding scores assigned to specific discharge diagnoses (20). Assessors recorded all drugs currently taken by the participants before admission: brand name, formulation, and daily dose were registered. All the drugs were coded according to the Anatomical Therapeutic and Chemical codes and the number of drugs used was then calculated.

Statistical Analysis

For descriptive purpose, baseline characteristics of the study population were compared according to presence or absence of sarcopenia, using a chi-square test for categorical variables and the analysis of variance or the nonparametric Wilcoxon Mann–Whitney test for continuous variables. Cox proportional hazard models with robust variance estimates were used to assess the association between clinical and functional characteristics and sarcopenia prevalence (21).

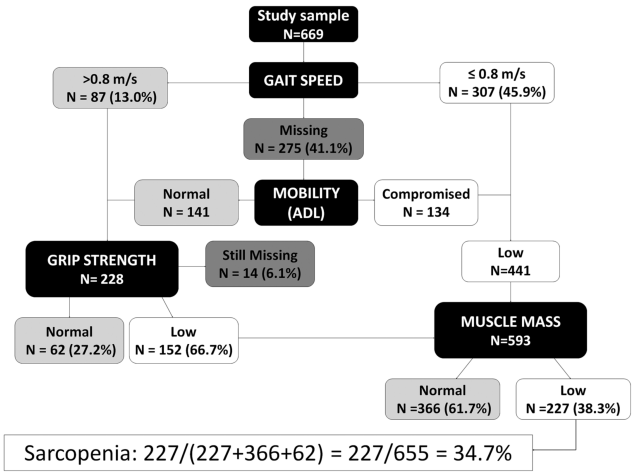

Figure 1. Application of the EWGSOP algorithm for the case finding of sarcopenia to the GLISTEN sample.

Candidate variables to be included in the Cox model were selected on the basis of biological and clinical plausibility as risk factor for sarcopenia. To identify factors independently associated with prevalent sarcopenia, we first estimated crude prevalence rate ratio and its 95% confidence interval (CI) and then controlling for age and gender. A multivariable Cox model was computed including all the variables that were associated with the outcome at an α level of .1, after adjustment for age and gender. Finally, redundant variables were removed using a stepwise backward selection technique (p for removal .1), in order to obtain a more parsimonious model. All analyses were performed using Stata 13.0 for Windows (StataCorp, College Station, TX).

Results

In this multicenter sample of 655 older patients (mean age 81.0 ± 6.8 years, 51.9% women), mean SMI, assessed at hospital admission, was 8.16 ± 2.10 kg/m^2. SMI was greater in men (p < .0001), was inversed related with age (r = –.24; p < .0001), and directly associated with grip strength (r = .35; p < .0001) and walking speed (r = .17; p = .0005).

Using the EWGSOP algorithm (Figure 1), 227 (34.7%) participants were identified as affected by sarcopenia: of them, 101 (44.5%) were sarcopenic because of low gait speed (n = 43, 18.9%) or poor grip strength (n = 58, 25.6%), whereas 126 (55.5%) had the concomitant presence of reduced muscle strength, and slow gait speed. Of the 169 patients with walking speed lower than 0.8 m/s at hospital admission, 90 (53.3%) had walking disability and 116 (68.6%) had basic ADL disability in the 2 weeks preceding hospitalization. SMI was 6.58 ± 1.37 and 9.00 ± 1.93 kg/m^2 in participants with and without sarcopenia, respectively (p < .0001).

Prevalence of sarcopenia on hospital admission increased steeply with age (Figure 2): from 11.1% and 30.2% in women and men aged 65–74 years, to 46.7% and 50.7% in women and men older than 85 years, respectively. General characteristics and comorbidities of participants according to gender and presence of sarcopenia are presented in Tables 1 and 2. Compared with participants without sarcopenia, those diagnosed with sarcopenia were significantly older, had lower BMI, higher number of errors at the SPMSQ, and greater prevalence of severe ADL disability and dementia. Females with sarcopenia were more likely to report unintentional weight loss; they also had lower prevalence of type 2 diabetes and higher prevalence of stroke and emergency hospital admission. Conversely, male

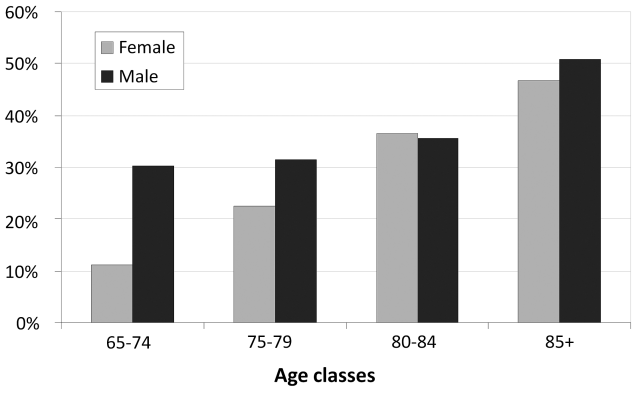

Figure 2. Crude prevalence of sarcopenia in men (black) and women (gray) according to age group.

Table 1. Selected General Characteristics of Study Participants According to Gender and Presence of Sarcopenia

	Women			Men		
	No Sarcopenia (*n* = 228)	Sarcopenia (*n* = 112)	*p* Value	No Sarcopenia (*n* = 200)	Sarcopenia (*n* = 115)	*p* Value
Age, mean ± *SD*	80.7 ± 6.8	85.2 ± 6.4	<.001	79.0 ± 6.1	81.1 ± 6.9	.004
Education (y), median [IQR]	5 [5, 8]	5 [4, 8]	.103	5 [5, 8]	5 [5, 8]	.694
Ever smoking, *n* (%)	52 (23.3)	25 (22.7)	.904	145 (74.0)	74 (66.7)	.173
Weight loss, *n* (%)	90 (40.0)	57 (51.8)	.041	84 (42.2)	59 (51.8)	.103
BMI, mean ± *SD*	27.4 ± 5.4	26.2 ± 5.5	<.001	27.1 ± 4.2	24.5 ± 3.8	<.001
Emergency admission, *n* (%)	143 (62.7)	95 (86.4)	<.001	146 (73.4)	87 (75.7)	.656
Previous falls, *n* (%)	77 (34.5)	40 (36.4)	.742	35 (18.0)	23 (21.5)	.467
Severe ADL disability, *n* (%)	60 (26.3)	47 (42.0)	.003	37 (18.5)	39 (33.9)	.002
ADL score, median [IQR]	1 [0, 3]	1 [0, 5]	.003	0 [0, 2]	1 [0, 4]	.014
15-item GDS, median [IQR]	5 [3, 9]	6 [3, 8]	.915	3 [2, 6]	5 [3, 8]	.017
SPMSQ, median [IQR]	2 [1, 4]	3 [1, 6]	.009	1 [1, 3]	2 [1, 4]	.021
Length of hospital stay (d), median [IQR]	9 [5, 13]	9 [6, 12]	.663	8 [5, 12]	9 [5, 12]	.900

Notes: p values are for chi-square test or analysis of variance or Wilcoxon Mann–Whitney test comparing subjects with and without sarcopenia. ADL = basic activities of daily living; BMI = body mass index; GDS = Geriatric Depression Scale; IQR = interquartile range; SPMSQ = Short Portable Mental Status Questionnaire.

Table 2. Selected Medical Conditions of Study Participants According to Gender and Presence of Sarcopenia

	Women			Men		
	No Sarcopenia (*n* = 228)	Sarcopenia (*n* = 112)	*p* Value	No Sarcopenia (*n* = 200)	Sarcopenia (*n* = 115)	*p* Value
Hypertension, *n* (%)	168 (73.7)	86 (76.8)	.536	150 (75.0)	87 (75.7)	.897
Coronary heart disease, *n* (%)	54 (23.7)	28 (25.2)	.756	63 (31.5)	34 (29.6)	.720
Atrial fibrillation, *n* (%)	56 (24.7)	32 (28.6)	.441	55 (27.5)	29 (25.2)	.659
Congestive heart failure, *n* (%)	38 (16.7)	27 (24.1)	.101	25 (12.5)	26 (22.6)	.019
Diabetes, *n* (%)	73 (32.0)	20 (17.9)	.006	64 (32.0)	32 (27.8)	.438
Arthritis, *n* (%)	74 (32.5)	25 (22.3)	.053	26 (13.0)	28 (24.4)	.010
COPD, *n* (%)	37 (16.2)	20 (17.9)	.705	73 (36.5)	37 (32.2)	.438
Stroke, *n* (%)	21 (9.2)	20 (17.9)	.021	23 (11.5)	18 (15.7)	.292
Dementia, *n* (%)	27 (11.8)	29 (25.9)	.001	17 (8.5)	20 (17.4)	.018
Chronic kidney disease, *n* (%)	41 (18.0)	22 (19.6)	.711	53 (26.5)	29 (25.2)	.803
Cancer, *n* (%)	24 (10.5)	13 (11.6)	.764	33 (16.5)	23 (20.0)	.434
Charlson Comorbidity Index, median [IQR]	3 [1, 4]	3 [2, 4.5]	.336	3 [2, 5]	3 [1, 4]	.639
Number of drugs, mean ± *SD*	6.0 ± 2.9	5.9 ± 2.8	.689	6.0 ± 3.0	6.1 ± 2.7	.814

Notes: p values are for chi-square test or analysis of variance or Wilcoxon Mann–Whitney test comparing subjects with and without sarcopenia. COPD = chronic obstructive pulmonary disease; IQR = interquartile range.

sarcopenic patients had higher prevalence of congestive heart failure, arthritis, and higher score at 15-item Geriatric Depression Scale.

After multivariable adjustment, the likelihood of being sarcopenic increased progressively and independently with advancing age (prevalence ratio [PR] 1.03; 95% CI 1.01–1.04), was associated with severe ADL disability (PR 1.32; 95% CI 1.06–1.63), history of congestive heart failure (PR 1.32; 95% CI 1.06–1.66), and stroke (PR 1.42; 95% CI 1.09–1.84). Conversely, a decreased probability of being sarcopenic was detected in women (PR 0.79; 95% CI 0.65–0.97) and with increasing BMI (PR 0.92; 95% CI 0.90–0.95) (Table 3).

Discussion

Among older Italian patients admitted to 12 acute hospital wards, sarcopenia, defined according to the EWGSOP operational criteria at hospital admission, is very common and its prevalence increases steeply with advancing age, both in men and women. After adjustment for potential confounders, increasing age, diagnosis of congestive heart failure, history of stroke, and severe ADL disability were directly associated with sarcopenia, whereas higher BMI and being woman were inversely associated with the presence of sarcopenia. More than 40% of patients enrolled in the study were not able to perform the 4-m usual walking speed test, as required by the EWGSOP diagnostic algorithm. These results are from one of the first large multicenter studies of hospitalized patients in which participants have been evaluated with standardized assessment methods across all clinical centers.

The estimated prevalence of sarcopenia from this multicenter study is in line, although somehow higher, with the findings of previous reports conducted in samples of older hospitalized patients using the same diagnostic criteria (11). Conversely, our estimated prevalence was lower if compared to studies that enrolled patients admitted to specific clinical settings including in-hospital rehabilitation

Table 3. Unadjusted and Multivariable Adjusted Prevalence Race Ratio of Sarcopenia According to Selected Characteristics

	Unadjusted	Age–Gender Adjusted	Fully Adjusted	Parsimonious Model[a]
Cox Model (equal time)	PR (95% CI)	PR (95% CI)	PR (95% CI)	PR (95% CI)
Age (y)	1.05 (1.03, 1.06)	1.05 (1.03, 1.07)	1.03 (1.01, 1.04)	1.03 (1.01, 1.04)
Female gender	0.90 (0.73, 1.11)	0.80 (0.65, 0.98)	0.81 (0.66, 0.99)	0.79 (0.65, 0.97)
Weight loss	1.33 (1.08, 1.64)	1.28 (1.04, 1.57)	1.05 (0.85, 1.30)	
BMI (kg/m^2)	0.92 (0.89, 0.94)	0.93 (0.90, 0.95)	0.93 (0.90, 0.96)	0.92 (0.90, 0.95)
Emergency admission	1.60 (1.21, 2.12)	1.31 (0.98, 1.75)	1.17 (0.88, 1.54)	
Severe ADL disability	1.57 (1.28, 1.93)	1.33 (1.07, 1.65)	1.28 (1.01, 1.64)	1.32 (1.06, 1.63)
SPMSQ	1.07 (1.03, 1.10)	1.03 (1.00, 1.07)	0.98 (0.94, 1.03)	
Congestive heart failure	1.42 (1.12, 1.79)	1.27 (1.01, 1.60)	1.31 (1.04, 1.64)	1.32 (1.06, 1.66)
Diabetes	0.73 (0.57, 0.95)	0.84 (0.65, 1.09)	0.94 (0.73, 1.22)	
Stroke	1.40 (1.08, 1.82)	1.32 (1.01, 1.73)	1.46 (1.12, 1.89)	1.42 (1.09, 1.84)
Dementia	1.66 (1.32, 2.09)	1.42 (1.13, 1.78)	1.26 (0.93, 1.70)	

Note: ADL = basic activities of daily living; BMI = body mass index; CI = confidence interval; PR = prevalence ratio; SPMSQ = Short Portable Mental Status Questionnaire.

[a]Backward stepwise logistic regression model (p value for removal >.1). For variables removed from the initial model, odds ratio and 95% CI are not displayed in table. Variables included in the initial model are all the same variables included in the full model.

ward in which sarcopenia prevalence was estimated as high as 60% (22), or significantly higher if compared to studies that used different assessment methods (10) or different inclusion criteria (12). For example, in the study of Cerri and coworkers, in which patients not able to walk were excluded from the analysis, the estimated prevalence was 21.4% (12). Furthermore, our study demonstrates that sarcopenia is more common in geriatric inpatients as compared to older community-dwelling populations (4), in agreement with the hypothesis that sarcopenia is a risk factor for hospitalization (3) and, at the same time, supporting the potential effectiveness of screening sarcopenia in the acute care setting.

In agreement with previous studies (11,16), we found a significant negative association between BMI values and the prevalence of sarcopenia, with patients with higher BMI levels having a lower likelihood of being sarcopenic. BMI is considered a rough marker of nutritional status and a measure of overall adiposity. Undernutrition is a powerful risk factor for sarcopenia (4,23) and might well explain the increased prevalence of sarcopenia in patients with lower BMI levels. On the other hand, although sarcopenia often coexists with elevated BMI, a condition referred to as sarcopenic obesity (24), it has been demonstrated that compared to normal weight individuals, obese subjects have greater thigh muscle volume, increased cross-sectional area of type I skeletal muscle fibers, increased muscle lipid content (25), and a lower muscle quality (26).

We found a greater prevalence of severe ADL disability in patients with sarcopenia compared to the non-sarcopenic counterpart; the association remained statistically significant after adjustment for age, comorbidities, and other potential confounding factors. These results are in line with previous cross-sectional and longitudinal studies which demonstrated an independent relationship of sarcopenia with the risk of functional impairment and disability (14,27). From this point of view, our findings reinforce the important clinical implications of sarcopenia in older people and support the usefulness of sarcopenia screening in older disabled patients; indeed in our sample, among the 183 patients with severe disability, almost one out of two (47%) were sarcopenic.

Congestive heart failure was more prevalent among male patients with sarcopenia compared to those with normal skeletal muscle mass and function, with an adjusted relative prevalence excess of 30%. Sarcopenia affects approximately 20% of ambulatory patients with heart failure (28), but its prevalence is probably greater among hospitalized decompensated patients. Indeed in our sample, prevalence of sarcopenia in patients with a diagnosis of congestive heart failure was as high as 45%. Heart failure is currently considered a systemic and multiorgan syndrome sustained by activated feedback signals from peripheral reflex circuits, systemic dysregulation of several hormonal pathways, and a global metabolic imbalance characterized by decreased oxidative capacity, impaired substrate use and energy transfer, and an overall catabolic/anabolic imbalance, that not only affect the myocardium but also peripheral tissues including skeletal muscle (29).

Sarcopenia was also more common in patients with history of stroke. Only a few studies formally investigated this association, with conflicting results: some studies reported a significant association only in men (30), while others failed to show any significant association (31). Within four hours after cerebral damage, the number of motor fibers in the muscles of the paretic limb decreases (32). Loss of muscle innervation leads to muscular weakness, inactivity, and immobilization, ultimately resulting in muscle atrophy. Within the first week after stroke, muscle weakness occurs also in the nonparetic limb (33) and skeletal muscle mass decreases to the same extent in both paretic and nonparetic legs in patients who are not able to relearn walking within 2 months after stroke (34). After stroke, several mechanisms, including malnutrition, immobilization, disuse, inflammation, and metabolic and neurovegetative imbalances, frequently contribute to muscle wasting and may progress to the stroke-related sarcopenia (35).

In agreement with previous reports in similar settings (13), more than 40% of the patients enrolled were not able to perform the 4-m walking test because of inability to walk or coexisting medical conditions that contraindicated the test administration at hospital admission. Previous work conducted on community-dwelling older people suggested that a sarcopenia definition based only on the presence of low muscle mass and low grip strength predicts the risk of incident disability and mortality as well as the original EWGSOP phenotype, suggesting that low walking speed might not be an essential criterion for the diagnosis of sarcopenia (3). Our results support the idea that focusing on the assessment of handgrip strength only might be sufficient to obtain a diagnosis of sarcopenia in patients with low muscle mass, seen in an acute care setting.

In interpreting our findings, some limitations should be considered. The cross-sectional design of the study did not allow us to clarify any temporal or causal relationships between sarcopenia and its associated factors. Acutely ill older patients may experience a transient impairment of walking speed and muscle strength, not related to sarcopenia, but due to the systemic effect of the acute disease leading to hospital. From this point of view, it might be argued that we might have overestimated the real prevalence of sarcopenia. Although we cannot completely rule out this possibility, the finding that most of patients with low walking speed at hospital admission reported also either mobility or basic ADL disability in the 2 preceding weeks, supports the hypothesis that the baseline performance evaluation is capturing more a pre-existing status rather than an acute transient physical decline. The use of BIA for muscle mass assessment presents some drawbacks, mainly due to the hydration problems usually observed in older persons, possibly resulting in an underestimation of body fat and an overestimation of fat-free mass. On the other hand, BIA is inexpensive, easy to use, readily reproducible, and appropriate for both ambulatory and bedridden patients, considered as a portable and feasible alternative to dual-energy X-ray absorptiometry (36), and its standardized use may favor a widespread assessment of body composition in everyday clinical practice. Finally, we were not able to formally differentiate cases of sarcopenia from cases of cachexia, a condition highly prevalent in the acute care wards (37). When assessed according to a modified version of the definition proposed by Evans et al. (38), cachexia was present in 5% of the sample; after exclusion of these cases, the prevalence of sarcopenia remained substantially unchanged (33.6%), suggesting that our estimate of sarcopenia on hospital admission was not strongly affected by the coexistence of cachexia.

In summary, in this sample of Italian hospitalized geriatric patients, the EWGSOP criteria identify sarcopenia as a very common condition, strongly related to advancing age and to specific clinical conditions, including poor functional and nutritional status and selected chronic morbidities. Whether a prompt diagnosis and adequate nutritional and pharmacological interventions would modify the prognosis of these patients remains to be determinate.

Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences* online.

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