Relationship of Sarcopenia and the modified Glasgow Prognostic Score with survival among patients with advanced cancer in palliative care

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BACKGROUND

Sarcopenia is an important marker that is associated with survival in patients with cancer and when it is added to inflammatory markers, like the Glasgow Prognostic Score, an important prognostic of the disease can be observed.

AIM

Evaluate the effect of sarcopenia and modified Glasgow Prognostic Score (mGPS) on survival among patients with advanced cancer in palliative care.

METHODS

Three hundred and four patients, from June of 2016 to March of 2017, were prospectively enrolled. Sarcopenia was diagnosed by concurrent loss of skeletal muscle mass and strength. Quantitative assessments of muscle mass were performed using the prediction equation of appendicular skeletal muscle mass (ASM) described by Baumgartner (1998), which uses: body weight, height, hip circumference and handgrip strength. Low muscle mass was defined as ASM index [ASM/Height $(cm)^2$] below 7.26 kg/m^2 for men and below 5.45 kg/m^2 for women. Low muscle strength was defined by the hand grip strength (HGS) below 30 kg for men and below 20 kg for women. The mGPS was compose by C-Reactive Protein (CRP) and serum albumin, where: Patients with both low albumin (<3.5 mg/L) and high CRP (>10 mg/L) were scored 2. Patients with normal albumin level ($\geqslant$ 3.5 g/L) and an elevated CRP (>10 mg/L) were assigned a score of 1. Patients with CRP below (10 mg/L) were allocated a score of 0. For the data analysis patients were grouped into 2 groups: mGPS=0 and $\geqslant$ 1.Overall survival (OS) rate was analyzed using Log-rank test and Kaplan-Meier curves was used to illustrated OS in sarcopenic and non sarcopenic and also in mGPS group=0 and $\geqslant$ 1. Associations between age, gender, GI tumor, KPS, mGPS and sarcopenia with survival was evaluated by hazard ratio (HR) and 95% confidence interval (CI) by Cox proportional hazard models in a univariate and multivariate analysis, which included parameters with statistical significance (p-value < 0.02) in the univariate analysis.

RESULTS

201 (66.1%) patients had sarcopenia and 64 (23.3%) an mGPS of 2 (Table 1). Sarcopenic patients were associated with a significantly inferior OS, compared to non sarcopenic patients (22 vs 46 days; log-rank test, p < 0.001) as noted Figure 1. According Figure 2 the OS was significantly lower in mGPS=0 group than in mGPS $\geqslant$ 1 group (42 vs 16 days; log-rank test, p < 0.001). In the Cox proportional analysis patients with GI tract tumor, KPS < 50%, mGPS $\geqslant$ 1 and sarcopenia presented an elevated risk for mortality in the univariate analysis (Table 2). Most of all, in the multivariate analysis patients with mGPS $\geqslant$ 1 presented a hazard for mortality around 2.5 times higher [HR: 2.78 (95%CI: 1.99; 3.88)] than those used as control (CRP < 10 mg/dL) (Table 2).

Table 1. Characteristics of the 304 patients with cancer treated at a Palliative Care Unit

Variables	(n = 304)
Age years**	63 (55;72)
Gender (female)	177 (58.2%)
Types of tumor	
GI Tract	86 (28.3%)
Gynecologic	60 (19.7%)
Head and neck	37 (12.2%)
Lung	30 (9.9%)
Breast	29 (9.5%)
Others	62 (20.4%)
KPS < 50%	80 (26.3%)
Laboratory tests	
Hemoglobin (g/dL)*	10.5 (±2.1)
Hematocrit (%)	32 (28.0; 37.0)
Lymphocytes (/µl)	1222 (861; 1654)
Leukocytes (/µl)	8900 (6300; 12300)
Albumin (g/dL)	3.4 (2.9; 3.9)
CRP (mg/L)	5.2 (1.6; 10.2)
mGPS †	
0	201 (73.1%)
1	10 (3.6%)
2	64 (23.3%)
BMI ≤ 20 kg/m^2	107 (35.3%)
HGS*	19.7 (±0.5)
Hip circumference (cm)*	93.6 (±0.6)
Sarcopenic	201 (66.1%)
Survival (days)**	62 (23; 142)

Note: n = number of observations; % = frequency; GI = gastrointestinal; KPS = Karnofsky Performance Status; CRP = C-reactive protein; mGPS = modified Glasgow Prognostic Score; BMI= body mass index; HGS = hand grip strength. † n = 275.
*Mean (SD standard deviation); **Median (IQR interquartile range).

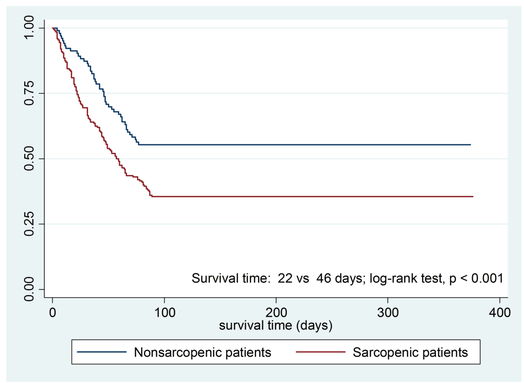

Figure 1. Kaplan-Meier curves – Survival time stratified according to sarcopenic or nonsarcopenic categories in patients with advanced cancer treated at a Palliative Care Unit in Rio de Janeiro-RJ.

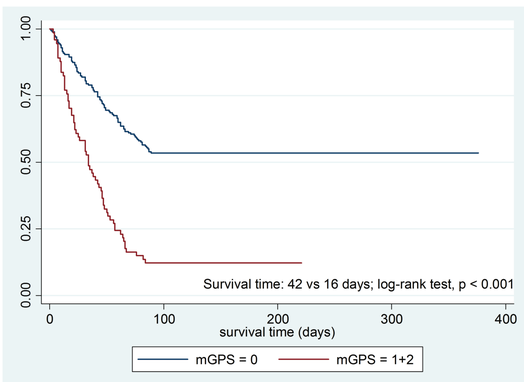

Figure 2. Kaplan-Meier – Survival time stratified according to modified Glasgow Prognostic Score categories in patients with advanced cancer treated at a Palliative Care Unit in Rio de Janeiro-RJ.
Note: mGPS= modified Glasgow Prognostic Score

Table 2. Factors associated with survival in patients with advanced cancer treated at a Palliative Care Unit in the city of Rio de Janeiro- Brazil (n=304).

	Univariate		Multivariate	
Variables	**HR (CI 95%)**	**p-value[a]**	**HR (CI 95%)**	**p-value[a]**
Age ≥ 60 years	0.91 (0.68; 1.23)	0.566		
Female gender	0.78 (0.57; 1.05)	0.103		
Types of tumor (GI Tract)	1.52 (1.11; 2.08)	0.009	1.53 (1.10; 2.14)	0.011
KPS (< 50%)	2.35 (1.72; 3.21)	<0.001	1.56 (1.10; 2.22)	0.012
mGPS (≥ 1)	3.18 (2.30; 4.39)	<0.001	2.78 (1.99; 3.88)	<0.001
Sarcopenia	1.79 (1.27; 2.50)	0.001	1.46 (1.00; 2.12)	0.045

Note: HR = Hazard Ratio; CI = confidence Interval; GI= gastrointestinal; KPS= Karnofsky Performance Status; mGPS = modified Glasgow Prognostic Score
[a]p-value refers to univariate and multivariate Cox regression

CONCLUSION

GI tract tumor, KPS < 50%, sarcopenia and mGPS $\geqslant$ 1 can predict survival among patients with advanced cancer receiving palliative care treatment. Moreover, mGPS presented to be an important and strong predictor of survival in this population.

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