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LETTER TO THE EDITOR

Left ventricular mass correlates with lean body mass in patients with disease-associated wasting

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Dear Editor,

The key feature of disease-associated malnutrition, or cachexia, is muscle wasting [1]. However, an efficient tool for the assessment of skeletal muscularity in daily practice is not available yet [2]. We recently demonstrated that left ventricular mass (LVM) as measured by echocardiography reflects nutritional status in patients with systemic sclerosis [3]. Similarly to skeletal muscles, cardiac myofibrils contain actin and myosin, and mitochondria are largely represented in the heart [4]. Therefore, cachexia and heart failure may evolve concurrently during disease [5]. To preliminarily explore the relationship between cachexia and heart failure, we assessed whether LVM correlates to whole body skeletal muscle mass in cachectic, hospitalized patients.

Adult patients admitted to our institution and meeting the definition of cachexia by Fearon et al. [1] were considered. Patients unable to give informed consent, with gastrointestinal obstruction or dysphagia, with acute or chronic heart failure, or with history of high blood pressure were excluded. Patients' lean body mass (LBM) was assessed by dual-energy X-ray absorptiometry (DXA; GE Lunar Prodigy; Madison, WI, USA). Internal diameter of left ventricle (LVID), thickness of the posterior wall (PWT), and thickness of the interventricular septum (SWT) were measured in M-mode, during the diastolic phase [6], by echocardiography (Toshiba Aplio 500; Toshiba, Italy, Rome) with a 3.75-MHz probe. Then, cardiac mass was calculated using the Devereux formula [7, 8]:

$$\mathrm{LVM(g)} = 0.8 \times \left(1.04\left[(\mathrm{LVIDd} \times \mathrm{PWTd} \times \mathrm{SWTd})^3 - (\mathrm{LVIDd})^3\right]\right) + 0.6.$$

Data obtained were then normalized by patients' body surface and are expressed as grams per square meter. Handgrip strength was also assessed (DynEx, Akern, Florence, Italy). Patients' anthropometry (weight, height, BMI) and biochemistry were collected from charts and recorded. Data have been analyzed using SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). Data are presented as M±SD.

Patients' characteristics are reported in Table 1. Mean absolute and normalized LVM were 117.3±47 g and 76.8±20.8 g/m^2, respectively. Mean lean body mass (LBM) was 34.0±7.1 kg. Absolute (Fig. 1) and normalized LVM correlated with LBM [r=0.971 and r=0.931, respectively; p<0.01]. Furthermore, LVM was correlated with circulating creatinine levels (r=0.868, p<0.01). No correlation was found between LVM and handgrip strength.

Our preliminary study shows that in cachectic patients, LVM correlates with LBM and serum creatinine, a recognized maker of muscularity [9]. Our results are consistent with previous animal studies showing that cancer causes a loss of cardiac mass [10] and that cancer-induced muscle loss is paralleled by similar reduction of heart's weight [11]. In humans, data are more scanty. Recently, Springer et al. showed that heart weight and left ventricle wall thickness are reduced in

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Table 1 Patients' characteristics

Sex (M:F)	13:1
Age (years)	58.0±20.4
Body weight (kg)	48.6±12.2
BMI	18.7±3.6
Albumin (g/dL)	3.7±0.51
Blood protein level (g/dL)	6.0±1.0
Body weight loss in the previous 6 months (kg)	7.6±8
Handgrip strength (kg)	19.4±7.5
Advanced cancer/chronic renal failure/pneumonia (*n*)	10/3/1

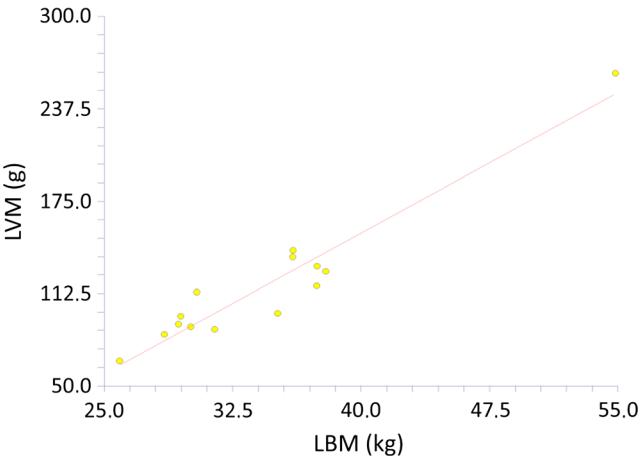

Fig. 1 Correlation between LVM and LBM

cancer patient [12]. Our study should be considered preliminary but strongly encourages the initiation of larger trials to assess the evolution heart mass and function during the clinical journey of cachexia.

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Conflict of interest statement Alessio Molfino, Alessia Papa, Maria L. Gasperini-Zacco, Maurizio Muscaritoli, Antonio Amoroso, Antonia Cascino, Carlo Catalano, Carlina V. Albanese, and Alessandro Laviano declare that they have no conflict of interest.

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