

ESPEN 2010

Lean body mass, left ventricular mass and heart function in patients with chronic obstructive lung disease.

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Rationale

Protein – and energy undernutrition are common in aged patients with chronic obstructive pulmonary disease (COPD). It is uncertain, however, whether total body mass or total muscle mass are the most important predictors for body function. We have studied the relation between the nutritional status and left ventricular (LV) mass and its effect on stroke volume (SV) and cardiac output (CO), in a group of patients with COPD.

Methods

We calculated body mass index (BMI)(kg/m²). Lean body mass (LBM) was assessed by DXA(kg), and LV mass by Magnetic Resonance Imaging (MRI) and normalized to body surface area (BSA)(g/m²). SV(ml) and CO(L/min) were measured by MRI. BMI and LBM were used as nutritional parameters, divided in 3 groups: low, medium and high. Heart function (SV and CO) was compared to these two parameters of nutritional status.

Results

All together 37 patients were included in this study with an average age of 63.9(±6.9) years. In the BMI group, stroke volume was 69.8(±19.8), 79.6(±18.6) and 77.5(±22.8) and cardiac output 5.6(±1.1), 6.1(± 0.79) and 5.5(±2.0), in low, medium and high BMI group, respectively. In the LBM group, the stroke volume was 63.0(±14.0), 74.3(±18.5) and 87.5(±21.5), and cardiac output was 5.1(±1.3), 5.6(±1.3) and 6.2(±1.3), in low, medium and high LBM group, respectively. There was significant correlations between LBM and CO (Pearson Correlation, p=0.017) and SV (p=0.001), and between LV mass and CO (Pearson Correlation, p=0.037) and SV (p=0.001), but not between BMI and cardiac function (CO, p=0.44, SV, p=0.104).

Conclusions

This study has demonstrated that heart function as measured by SV and CO correlated to lean mass and LV mass, but not to BMI. This findings support the notion that lean tissue might be essential for cardiac function in patients with COPD, and a more important predictor for body function than total body mass.