SUPPLEMENTARY TABLES AND FIGURES

Figure S1. Flow chart study population.

Definition of abbreviations: EBV = endobronchial valve; CT = computed tomography.

Table S1. Patient characteristics (N=49).

Male/Female, N	16 / 33
Age, mean (range),years	59 (42 to 76)
Pack years	37 (31 to 43)
Length, m	1.69 (1.67 to 1.72)
Weight, kg	70.1 (66.5 to 73.7)
BMI, kg/m^2	24.4 (23.4 to 25.5)
FEV_1	
Liters	0.8 (0.8 to 0.9)
% of predicted value	30.3 (28.0 to 32.6)
FVC	
Liters	2.6 (2.4 to 2.9)
% of predicted value	78.1 (72.9 to 83.3)
FEV_1/FVC	32.6 (30.6 to 34.6)
RV	
Liters	4.5 (4.2 to 4.8)
% of predicted value	215.2 (205.3 to 225.0)
TLC	
Liters	7.5 (7.1 to 7.9)
% of predicted value	130.8 (127.3 to 134.2)
RV/TLC	60.3 (57.7 to 62.8)
6MWD, meter	357.6 (332.8 to 382.3)
Skeletal muscle cross-sectional area, median (range)(cm^2)	88.0 (55.6 to 162.4)
Intramuscular fat cross-sectional area, median (range) (cm^2)	22.0 (5.7 to 74.7)
Subcutaneous fat cross-sectional area, median	104.2 (14.7 to 262.1)

(range) (cm^2)

Data are represented as mean (95% confidence interval), unless stated otherwise.

Definition of abbreviations: BMI = body mass index; FEV_1 = forced expiratory volume in 1 second; FVC = forced vital capacity; RV = residual volume; TLC = total lung capacity; 6MWD = 6-minute walk distance.

SUPPLEMENTARY PANEL S1: METHODS

Study population and study design

A post-hoc analysis of a randomized controlled crossover trial investigating endobronchial valve (EBV) treatment conducted at the University Medical Centre Groningen in the Netherlands from June 2011 until November 2014 (STELVIO trial NTR2876) was performed. The full and detailed methodology of this study has been published previously.[1] In short, patients with advanced emphysema and a confirmed absence of collateral ventilation by the Chartis measurement were included. Only EBV treated patients who fully completed the study were eligible for analysis in this study. The initial trial randomized patients to active treatment (EBV group), or control (control group), with at 6 months after randomisation crossover to active treatment for the control group. CT images were obtained at baseline and 6 months follow-up after EBV treatment. Spirometry and bodyplethysmography were performed according to the ATS/ERS guidelines.[2] Furthermore, exercise capacity was measured by a 6-minute walk distance (6MWD) test according to the ATS guidelines.[3] Height and body weight were assessed. All tests were performed at baseline and 6 months follow-up after EBV treatment. The study was approved by the ethics committee of the University Medical Centre Groningen.

Image analysis

In this post-hoc analysis of the STELVIO trial skeletal muscle and adipose tissue were analysed on CT scan by assessment of the cross-sectional area at the first lumbar level (L1). Skeletal muscle cross-sectional area, intramuscular fat cross-sectional area and subcutaneous fat cross-sectional area were analysed with Slice-O-Matic software v5.0 (Tomovision, Montreal, Canada). One image was selected for each patient. During anatomical land marking, the first image at L1 with both vertebral transverse processes clearly visible, was used in the analysis. The skeletal muscle measurements included the psoas, erector spinae, quadratus lumborum, transversus abdominis, external and internal oblique, and rectus abdominis muscles. Cross-sectional area of these structures were quantified by one assessor on the basis of pre-established thresholds of Hounsfield units (skeletal muscle -29 to 150, subcutaneous fat -190 to -30, and intramuscular fat -190 to -30). Boundaries were corrected manually as necessary. Changes in cross-sectional area between

CT scans were expressed in squared centimetres. Our group found a mean coefficient of variation between observers of 1.3% for skeletal muscle area [data unpublished], which is in line with a variation of 0–2% in other studies.[4-6] Therefore, changes of larger than -1.3% were considered as 'loss of skeletal muscle', while changes smaller than -1.3% were considered 'maintenance or gain of skeletal muscle'. Additionally, the mean Hounsfield units of the muscle cross-sectional area were assessed, as a measure for muscle fat deposits. Low values reflect increased intramuscular fat.

Statistical analyses

Patients were included if the CT scan contained L1. Descriptive statistics of demographic and clinical variables were obtained. Means (95% confidence interval) were provided for continuous normally distributed variables, median (range) for continuous not-normally distributed variables and percentages were shown for categorical variables. Baseline and 6 months follow up measurements were compared with a paired-samples t test or Wilcoxon signed-rank test. A multiple linear regression model was constructed to assess the contribution of body composition changes to changes of 6MWD (6 months follow-up compared to baseline). The model was constructed including covariates that were found significant in univariate analyses, i.e. change in skeletal muscle cross-sectional area, change in intramuscular fat cross-sectional area, 6MWD at baseline, delta residual volume and gender. Data were tested for multicollinearity and possible influential outliers. All analyses were performed using SPSS statistical software (SPSS Statistics for Windows, Version 24.0, IBM, Armonk, NY). Results with two-sided *p* values (≤0.05) were considered statistically significant.

References

1. Klooster K, ten Hacken NH, Hartman JE, et al. Endobronchial Valves for Emphysema without Interlobar Collateral Ventilation. N Engl J Med 2015;**373**(24):2325-35.
2. Miller MR, Hankinson J, Brusasco V, et al. Standardisation of spirometry. Eur Respir J 2005;**26**(2):319-38.
3. Brooks D, Solway S, Gibbons WJ. ATS statement on six-minute walk test. Am J Respir Crit Care Med 2003;**167**(9):1287.
4. Prado CM, Lieffers JR, McCargar LJ, et al. Prevalence and clinical implications of sarcopenic obesity in patients with solid tumours of the respiratory and gastrointestinal tracts: a population-based study. Lancet Oncol 2008;**9**(7):629-35.

5. Mourtzakis M, Prado CM, Lieffers JR, et al. A practical and precise approach to quantification of body composition in cancer patients using computed tomography images acquired during routine care. Appl Physiol Nutr Metab 2008;**33**(5):997-1006.
6. Irving BA, Weltman JY, Brock DW, et al. NIH ImageJ and Slice-O-Matic computed tomography imaging software to quantify soft tissue. Obesity (Silver Spring) 2007;**15**(2):370-6.