

Quantitative CT assessment between intercostal muscle mass and emphysema score in COPD patients

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PURPOSE: It is known the association of the body mass index (BMI) representing muscle depletion and severity of chronic obstructive pulmonary disease (COPD). We retrospectively investigated whether COPD patients have the association between the mass of intercostal muscle and emphysema score through quantitative CT assessment.

MATERIALS AND METHODS: Ninety-eight male patients underwent pulmonary function tests, BMI and quantitative CT assessment (Age; 69.9 ± 9.8 years, BMI; 22.8 ± 4.3 kg/m²). These patients were grouped into mild (n = 30), moderate (n = 28), severe (n = 22), very severe (n = 18) COPD according to GOLD spirometric criteria. The coronal reformatted pre-enhanced CT image was obtained to assess the cross-sectional areas (CSA) of threshold between -29 and +150 HU in the intercostal muscles and intercostal index was calculated as the CSA for those muscle divided to height square. Also we used in-house software to measure the emphysema score by CT, including CT emphysema score, and mean lung density (MLD).

RESULTS: BMI was not statistically different among three groups of COPD patients, except very severe COPD. On the other hand, intercostal index reflected the COPD severity, presenting the highest values in mild COPD. The intercostal index correlated with FEV1% (r = 0.60), FVC% (r = 0.58), FEV1/FVC ratio (r = 0.39), CT emphysema index (r = -0.57) and MLD (r = 0.32). Those parameters still significantly correlated, after adjusting the confounding factors such as age, smoking, BMI.

CONCLUSION: Chest CT is useful to assess not only the emphysema severity but also intercostal muscle. The intercostal index may be more accurate parameter compared to BMI, representing COPD severity.