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Relationship Between Lung Function and Skeletal Muscle Morphology in Predicting Risk of Cachexia

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Cancer cachexia is prevalent among many cancer types and can drastically alter metabolism. These alterations can result in irreversible changes to one's muscle composition, exacerbating disease outcome and reducing quality of life. **PURPOSE:** This preliminary study was intended to assess the relationship between pulmonary function and longitudinal changes in body mass (BM) and muscle density. **METHODS:** A subset of 16 patients (12 males, 4 females; age 65.6±7.4 y/o; BMI 26.9±3.9) with stage 3 non-small cell lung cancer (NSCLC) from the ACRIN-NSCLC-FDG-PET collection of The Cancer Imaging Archive (TCIA) were included in analysis (DOI: 10.7937/tcia.2019.30ilqfcl). Participants completed pulmonary function tests at intake (baseline) to quantify force of expired volume (FEV1). Two full body computed tomography (CT) scans were obtained approximately six months apart: the first at baseline and the second after chemoradiation treatment. Scans were evaluated bilaterally to quantify muscle density via CT attenuation for subcutaneous adipose tissue (SAT), pectoralis major, erector spinae, oblique muscles, psoas, gluteus maximus, gluteus medius and piriformis at various anatomical levels. The absolute change in CT attenuation between timepoints and relative change in BM were calculated for each patient, and their association to baseline pulmonary test performance was assessed using Pearson's R. **RESULTS:** FEV1 was positively correlated with attenuation at baseline in pectoralis major (r=0.602, p=0.018), erector spinae (r=0.684, p=0.005), gluteus medius (r=0.578, p=0.024) and piriformis (r=0.597, p=0.019) and with relative changes in BM (r= 0.627, p=0.012). Neither FEV1 or changes in BM were correlated with CT attenuation changes for SAT or any muscles evaluated. **CONCLUSION:** This preliminary analysis suggests that greater pulmonary function may be related to enhanced protection against weight loss, as seen with cancer cachexia. Further, while a higher FEV1 may be associated with greater muscle density initially, it is not indicative of future changes to muscle quality (i.e., muscle wasting). Future research should evaluate the impact of exercise, surrounding chemoradiation treatment to further identify opportunities to preserve a patient's physical function capacity and quality of life.

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