Body Composition appears to be *correlated* with *cancer survival*, *patient symptoms* and physician *treatment decisions* in mNSCLC.

Body composition reporting, as a measure of host reserve capacity, could influence treatment decisions and has the potential to become an important tool in the management of metastatic cancer.

Validation of this data is warranted.

The association between body composition, quality of life (QoL), overall survival (OS) and decision to treat (DTT) in patients with metastatic non–small cell lung cancer (mNSCLC)

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BACKGROUND

- Metastatic Lung Cancer is a leading cause of cancer death. Patient outcomes are based on the effectiveness of therapy and the patient's ability to tolerate therapy.
- Body composition of fat and muscle, measured with computed tomography (CT), has been shown to be prognostic of outcomes in many diseases and early-stage cancer.
- CT scans are performed routinely before and during treatment to assess tumor response to treatment, but measurement of fat and muscle is not performed routinely.
- Here we evaluated the relationship between body composition and QoL, OS, and DTT in mNSCLC patients.

METHODS

- Data from 80 mNSCLC patients with CT scans within from 60 days before to 30 days after metastasis diagnosis, and NCI PROMIS questionnaires within the first three months of diagnosis were collected from Huntsman Cancer Institute (Salt Lake City, UT).
- sliceOmatic 5.0 software (Tomovision, Magog, CA) was used to segment skeletal muscle (SKM), intermuscular adipose tissue (IMAT), visceral adipose tissue (VAT), and subcutaneous (SAT) at the L3 vertebral level using fixed thresholds based on the Alberta Protocol.
- Regions were manually edited as needed by an expert radiologist and area (cm^2) and radiodensity (Hounsfield Units - HU) were quantified.
- PROMIS PROs (pain, fatigue, anxiety, depression, and physical function) were collected in the clinic using an iPad as an institutional quality initiative.
- Multivariable Cox proportional hazard regression was used to investigate the relationship between body composition and overall survival.
- Multivariable linear regression was used to investigate the relationship between PROs and body composition.
- Multivariable logistic regression was used to investigate the relationship between receiving treatment and body composition.
- Significance was tested using t-test or Wald test.
- Multivariable models are adjusted for age at metastasis diagnosis (years), gender, mutation status, and smoking history.

RESULTS

Table 1. Participant Characteristics

Variable		Summary (N=71)
Gender n(%)	Female	34 (47.9%)
	Male	37 (52.1%)
Age at Metastasis Diagnosis	Mean (SD)	66.4 (11.6)
	Median (IQR)	67.4 (58.3, 73.9)
Smoking History n(%)	History of smoking	46 (64.8%)
	No history of smoking	25 (35.2%)
Targetable mutation status n(%)	Mutation	17 (23.9%)
	Wild type	54 (76.1%)
Skeletal Muscle (Area cm2)	Median (IQR)	116.9 (93.7, 142.2)
Intermuscular Adipose Tissue (Area cm2)	Median (IQR)	7.0 (3.2, 11.7)
Visceral Adipose Tissue (Area cm2)	Median (IQR)	112.0 (49.3, 165.8)
Subcutaneous Adipose Tissue (Area cm2)	Median (IQR)	148.5 (87.4, 228.5)
Patient Reported Outcomes		
Physical Function	Median (IQR)	38.5 (31.1, 44.9)
Depression	Median (IQR)	55.0 (49.9, 60.1)
Anxiety	Median (IQR)	60.9 (52.9, 66.9)
Pain	Median (IQR)	58.0 (51.0, 65.5)
Fatigue	Median (IQR)	60.5 (54.7, 65.8)

Missing values: Subcutaneous Adipose Tissue (Mean HU)=1, Functionality=1, Depression=3, Anxiety=2, Pain=2, Fatigue=2.

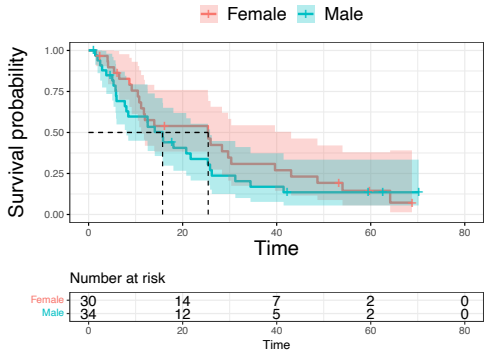

Figure 1. Kaplan Meier curve of overall survival stratified by gender. The median time to OS was 16 months. When stratified by sex, females had a longer median survival time (female 25 months, male 14 months).

Table 2. Significant Associations Between Body Composition & OS.

Models	Variables	Interquartile range (IQR)	HR per IQR (95%CI)
Area (Adjusted†)	**Skeletal Muscle (Area cm^2)**	53.05	0.37 (0.16, 0.87)
	Targetable mutation Status: MT	-	0.26 (0.11, 0.61)
Radiodensity (Crude)	**Visceral Adipose Tissue (Mean HU)**	12.61	2.57 (1.1, 6.01)

† The adjustment variables are gender, smoking history, targetable mutation status, and age at metastasis diagnosis.

- For fixed values of other body composition measures as well as covariates, increased skeletal muscle area was associated with a reduced hazard of death (HR 0.37 per IQR).
  - For comparison, the impact of having a targetable mutation in the same model has an HR of 0.26.
- High VAT radiodensity was associated with increased hazard of death in the unadjusted model.

Significant Associations between Body Composition & PROs

- On average, for every 13 cm^2 (IQR) increase in skeletal muscle, physical function increases by 3.88 (95% CI 0.37, 7.39).
- Higher VAT (area) and SKM (radiodensity) are associated with lower pain and fatigue, respectively.

Probability of Receiving Treatment Based on Body Composition

- Lower IMAT and higher SAT (area) are associated with increased odds of receiving treatment.
- No evidence of associations was found between radiodensity body composition measures and probability of receiving treatment.

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