Analytic Morphomics Predict Outcomes After Lung Transplantation.

BACKGROUND: The purpose of this study was to identify morphomic factors on standard, pretransplantation computed tomography (CT) scans associated with outcomes after lung transplantation.

METHODS: A retrospective review of 200 patients undergoing lung transplantation at a single institution from 2003 to 2014 was performed. CT scans obtained within 1 year before transplantation underwent morphomic analysis. Morphomic characteristics included lung, dorsal muscle group, bone, and subcutaneous and visceral fat area and density. Patient data were gathered from institutional and United Network for Organ Sharing databases. Outcomes, including initial ventilator support greater than 48 hours, length of stay, and survival, were evaluated using univariate and multivariable analyses.

RESULTS: On multivariable Cox regression, subcutaneous fat/total body area (hazard ratio [HR] 0.60, p = 0.001), lung density 3 volume (HR 0.67, p = 0.013), and creatinine (HR 4.37, p = 0.010) were independent predictors of survival. Initial ventilator support more than 48 hours was associated with decreased vertebral body to linea alba distance (odds ratio [OR] 0.49, p = 0.002) and Zubrod score 4 (OR 14.0, p < 0.001). Increased bone mineral density (p < 0.001) and increased cross-sectional body area (p < 0.001) were associated with decreased length of stay, whereas supplemental oxygen (p < 0.001), bilateral transplantation (p = 0.002), cardiopulmonary bypass (p < 0.001), and Zubrod score 3 (p < 0.001) or 4 (p = 0.040) were associated with increased length of stay.

CONCLUSIONS: Morphomic factors associated with lower metabolic reserve and frailty, including decreased subcutaneous fat, bone density, and body dimensions were independent predictors of survival, prolonged ventilation, and increased length of stay. Analytic morphomics using pretransplantation CT scans may improve recipient selection and risk stratification.