

Characterizing Muscle Phenotype and Prognosis in Patients with Multiple Myeloma

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Background/Objective:

Low muscle mass (myopenia), poor muscle quality, myosteatorsis, and muscle loss are associated with mortality in solid tumors. However, their impact in hematological malignancies remains unclear. We sought to determine how muscle phenotype relates to survival in patients with multiple myeloma.

Methods:

We performed a retrospective review of patients with multiple myeloma treated at Indiana University Hospital from 2012-2016. Total skeletal muscle area (SMA) (cm²) and radiodensity were measured on baseline (closest to diagnosis) and last CT scans at the third lumbar vertebrae area. SMA was normalized to height (SMA cm²/m²) to define skeletal muscle index (SKMI). Myopenia was defined as (SKMI) <52.4 cm²/m² (men) and <38.5 cm²/m² (women). Myosteatorsis and obesity were defined per published BMI-specific cutoffs. Difference in survival between groups was estimated using log rank test.

Results:

Of 455 patients with multiple myeloma, 137 had more than one CT scan; 42 of these have been assessed to date. Half (21/42) were myopenic. Myopenia was equally prevalent across BMI categories and showed no association with survival. More than half of patients displayed myostetatorsis; however, this was not associated with survival. Obesity and myopenic obesity were likewise not correlated with survival. Below-median baseline SKMI correlated with mortality, HR 2.721 (95% CI, 1.160-5.564; *P*=0.0129). As well, below-median final SMA correlated with mortality, HR 2.381 (95% CI, 1.094-5.181, *P*=0.0213). On average patients lost .7129% of SMA (95% CI; -6.072%-4.646%). Females had higher mortality, HR 2.355 (95% CI 0.9895-5.604, *P*=0.0215).

Conclusion and Potential Impact:

Although this study represents a fraction of treated patients to date, myopenia was prevalent among patients at diagnosis of multiple myeloma. Low muscle mass and sex appear to be important prognostic factors for survival. Additional measurements as well as univariate and multivariate analyses are necessary to verify these findings and identify additional factors that contribute to survival in multiple myeloma.