

Circulating Biomarkers and CT-Derived Muscle Indices in Colon Cancer: A Comprehensive Evaluation of Sarcopenia

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Abstract

Background: Sarcopenia and cancer-associated muscle loss are clinically relevant in patients with colon cancer, but their assessment requires the integration of muscle strength, muscle quantity or quality, and physical performance. Circulating biomarkers and CT-derived muscle indices may provide complementary information regarding muscle-related alterations, although their individual diagnostic performance remains uncertain.

Methods: This observational study included 30 patients with histologically confirmed colon cancer and 30 individuals in a control group. Participants were evaluated using computed tomography (CT), anthropometric and body composition measurements, and biochemical analysis. Muscle quantity was assessed at the level of the third lumbar vertebra (L3) using the skeletal muscle index (SMI) and psoas muscle index (PMI), while circulating biomarkers were measured using enzyme-linked immunosorbent assay (ELISA). Statistical analyses included between-group comparisons, receiver operating characteristic (ROC) curve analysis with area under the curve (AUC) estimation, precision-recall analysis, and an exploratory multivariable binary logistic regression model.

Results: Patients with colon cancer showed modest differences in circulating biomarker profiles compared with controls, including lower Osteonectin and IGF-1 levels and higher P3NP levels. CT-derived muscle indices were broadly comparable between groups. ROC analysis demonstrated limited discriminatory performance for the evaluated biomarkers, with no statistically significant differences in AUC between groups. In the exploratory multivariable logistic regression model, none of the evaluated biomarkers or CT-derived muscle indices was independently associated with colon cancer status.

Conclusions: The evaluated circulating biomarkers and CT-derived muscle indices showed limited discriminatory performance when considered individually. These findings suggest that biochemical and imaging-derived measures should be interpreted within a broader clinical framework. Because muscle strength and physical performance were not assessed, the present study does not establish an EWGSOP2-defined diagnosis of sarcopenia and should be interpreted as an evaluation of CT-defined muscle quantity and its biochemical correlates.

Keywords: sarcopenia, colon cancer, biomarkers, skeletal muscle index, psoas muscle index, computed tomography, muscle wasting, inflammation