



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Association of Muscle Mass and Quality with Incident Acute Kidney Injury in a Chronic Kidney Disease Cohort

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Objectives : Sarcopenia is a key prognostic factor in chronic kidney disease (CKD), but whether muscle mass or quality better predicts incident acute kidney injury (AKI) remains unclear. This study compared AI-based muscle indices in a large CKD cohort to determine if muscle quality offers superior prognostic value over mass for incident AKI assessment.

Methods : In 5,053 patients with CKD, AI was utilized to subclassify the L3 skeletal muscle area (SMA) into normal-attenuation muscle area (NAMA [high-quality muscle]; 30–150 HU) and low-attenuation muscle area (LAMA [myosteatosis]; –29 to 29 HU). These indices were normalized by height squared and categorized into tertiles (T1–T3). The primary outcome was incident AKI based on KDIGO criteria.

Results : Among 5,053 participants (57.3% male; mean age 61.2 years), Kaplan–Meier analysis showed all muscle indices correlated significantly with incident AKI risk ($p < 0.01$). In multivariable Cox models for Stage 2–3 AKI, the highest NAMA/height squared tertile (T3) was associated with a significantly lower risk (Adjusted HR [aHR], 0.13; 95% CI, 0.05–0.35) compared to T1. Conversely, the highest LAMA/height squared tertile (T3) was associated with a markedly increased risk of severe AKI (aHR, 4.06; 95% CI, 1.56–10.54). Notably, while SMA/height squared was not statistically significant for Stage 2–3 AKI (aHR, 0.51; $p=0.12$), qualitative indices (NAMA and LAMA) provided refined and significant predictive value.

Conclusions : Muscle quality is a more sensitive independent predictor of incident AKI risk and severity than muscle mass in CKD patients. NAMA/height squared serves as a protective factor, whereas LAMA/height squared acts as a risk factor. These findings support using existing CT data as an opportunistic tool to refine AKI risk stratification without additional testing.

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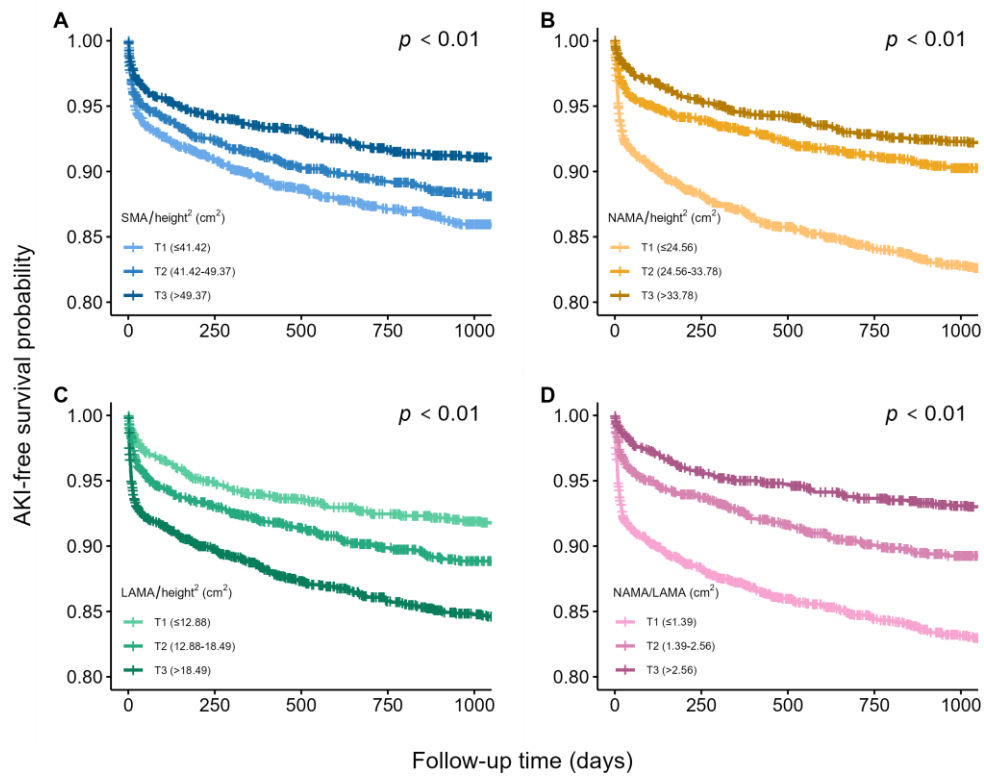
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