



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Longitudinal Association Between Bone Loss and Muscle Wasting in Hemodialysis Patients

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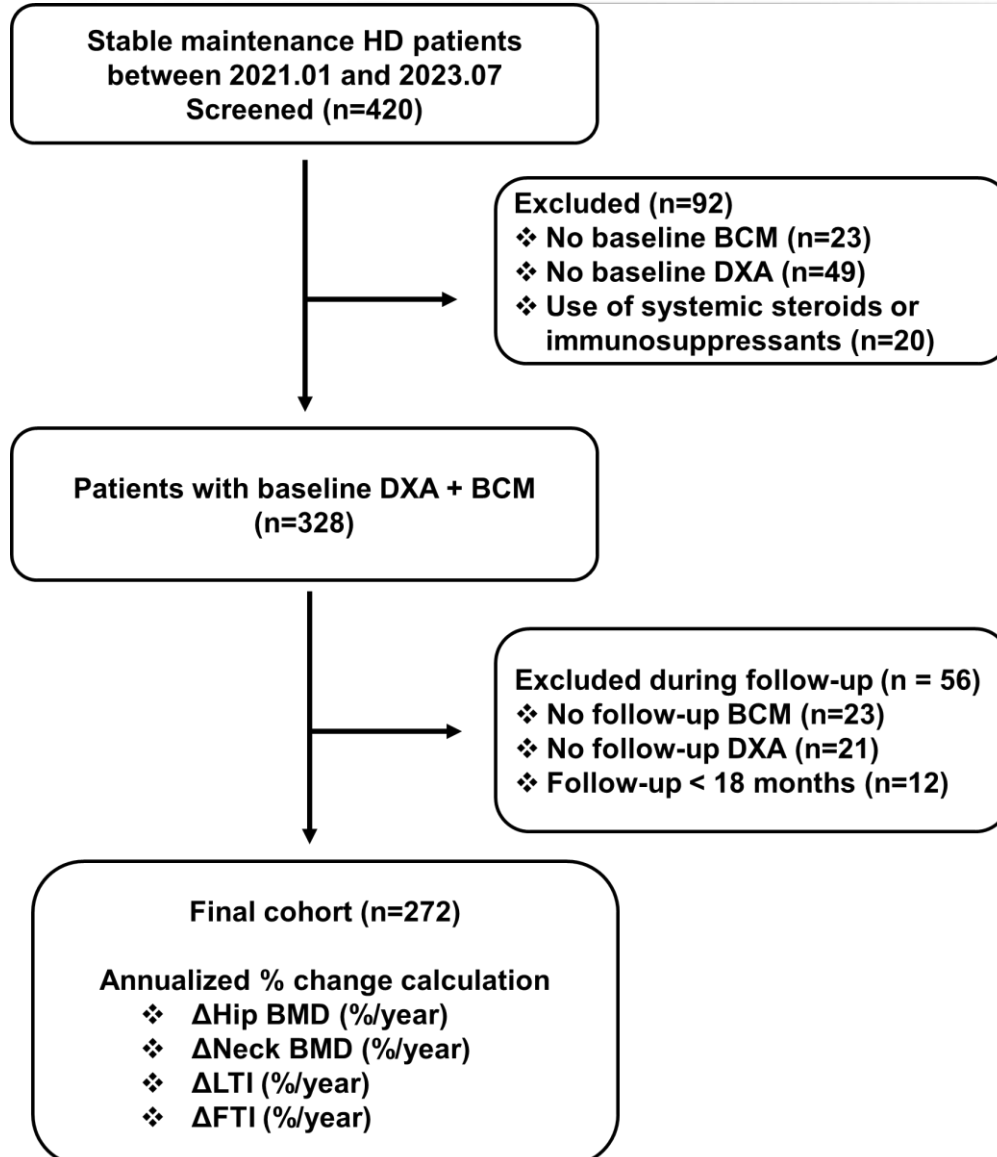
Objectives : longitudinal data on their concurrent changes remain limited. We examined whether changes in hip BMD over time were associated with concurrent changes in lean tissue index (LTI).

Methods : We studied 272 stable HD patients who underwent dual-energy X-ray absorptiometry (hip, femoral neck, and lumbar spine BMD) and body composition monitoring at baseline and after approximately 2 years. Annualized percentage changes in hip BMD and LTI ($\Delta\%$ /year) were calculated. Patients were categorized into tertiles of annualized hip BMD change (T1: greatest loss; T3: least loss/gain), and multivariable linear regression was used to identify independent predictors of Δ LTI.

Results : Patients in the tertile with the greatest hip BMD loss exhibited significantly greater declines in LTI compared with those in the intermediate and lowest-loss tertiles (-2.65 ± 9.70 vs 0.03 ± 8.59 and 1.27 ± 8.50 %/year, P for trend = 0.004). In the overall cohort, severe hip BMD loss remained independently associated with greater LTI decline ($\beta = -0.176$, 95% CI -5.31 to -0.34), and serum albumin ≤ 3.5 g/dL was also an independent predictor of Δ LTI. In stratified analyses, the association between hip BMD loss and LTI decline was evident only among patients with albumin ≤ 3.5 g/dL ($\beta = -0.427$, 95% CI -10.61 to -1.53), but not in those with higher albumin levels. Restricted cubic spline models demonstrated a graded, approximately linear relationship whereby greater losses of hip and femoral neck BMD were accompanied by larger declines in LTI, with wider uncertainty at the extremes.

Conclusions : Among HD patients, greater hip BMD loss tends to co-occur with more pronounced LTI loss, particularly in those with hypoalbuminemia. These findings suggest that concurrent deterioration of bone and muscle reflects a shared malnutrition–inflammation catabolic milieu, rather than a strong independent causal effect of bone loss on muscle wasting.

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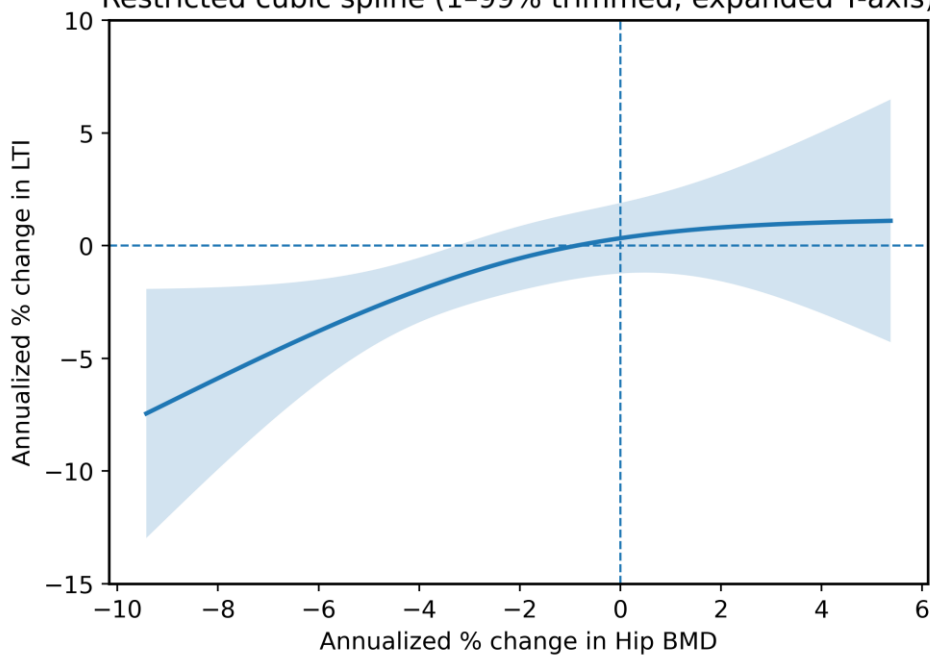
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A Restricted cubic spline (1–99% trimmed, expanded Y-axis)



B Restricted cubic spline: Neck BMD vs LTI (winsorized 1–99%)

