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Association of Parameters of Mineral Bone Disorder with Mortality in Patients on Hemodialysis according to Level of Residual Kidney Function

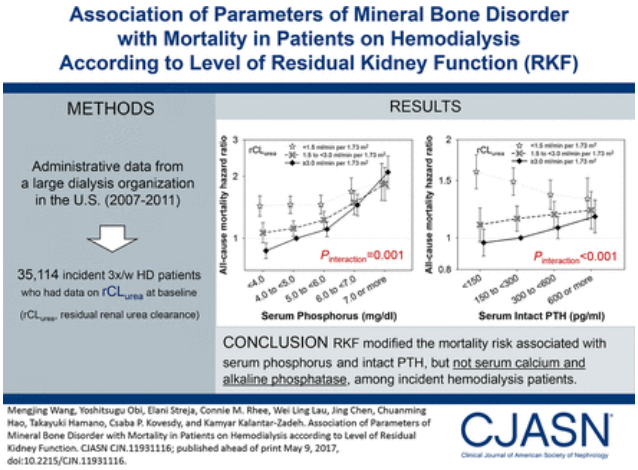
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Visual Overview



Abstract

Background and objectives The relationship between mineral and bone disorders and survival according to residual kidney function status has not been previously studied in patients on hemodialysis. We hypothesized that residual kidney function, defined by renal urea clearance, modifies the association between mineral and bone disorder parameters and mortality.

Design, setting, participants, & measurements The associations of serum phosphorus, albumin-corrected calcium, intact parathyroid hormone, and alkaline phosphatase with all-cause mortality were examined across three strata (<1.5, 1.5 to <3.0, and ≥3.0 ml/min per 1.73 m^2) of baseline residual renal urea clearance using Cox models adjusted for clinical characteristics and laboratory measurements in 35,114 incident hemodialysis patients from a large United States dialysis organization over the period of 2007–2011.

Results A total of 8102 (23%) patients died during the median follow-up of 1.3 years (interquartile range, 0.6–2.3 years). There was an incremental mortality risk across higher serum phosphorus concentrations, which was pronounced among patients with higher residual renal urea clearance ($P_{interaction}$=0.001). Lower concentrations of serum intact parathyroid hormone were associated with higher mortality among patients with low residual renal urea clearance (*i.e.*, <1.5 ml/min

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per 1.73 m^2), whereas higher concentrations showed a higher mortality risk among patients with greater residual renal urea clearance (*i.e.*, ≥1.5 ml/min per 1.73 m^2; $P_{interaction}<0.001$). Higher serum corrected total calcium and higher alkaline phosphatase concentrations consistently showed higher mortality risk ($P_{trend}<0.001$ for both) irrespective of residual renal urea clearance strata ($P_{interaction}=0.34$ and $P_{interaction}=0.53$, respectively).

Conclusions Residual kidney function modified the mortality risk associated with serum phosphorus and intact parathyroid hormone among incident hemodialysis patients. Future studies are needed to examine whether taking account for residual kidney function into the assessment of mortality risk associated with serum phosphorus and intact parathyroid hormone improves patient management and clinical outcomes in the hemodialysis population.

Mortality chronic kidney failure hemodialysis end stage kidney disease mineral metabolism renal function Albumins Alkaline Phosphatase calcium Follow-Up Studies Humans Minerals parathyroid hormone Phosphorus Phosphorus, Dietary Proportional Hazards Models renal dialysis Risk urea Urinary Tract Physiological Phenomena

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