

Association of Serum Sodium with Bone Metabolism and Fracture Risk in Patients Undergoing Hemodialysis

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Summary

Introduction: Hyponatremia is implicated in pathological bone resorption and has been identified as a risk factor for bone fracture in the general population, but limited data exist in patients undergoing dialysis.

Methods: We analyzed a historical cohort of 2,220 patients undergoing maintenance hemodialysis in Japan. We first examined the association of baseline serum sodium levels with metacarpal bone mineral density (BMD) in a subcohort of 455 patients with available data. Next, we examined the association of baseline serum sodium levels with incident fracture and mortality in the overall cohort, using Cox regression models adjusted for potential confounders (age, sex, dialysis vintage, diabetes, prior cardiovascular disease, history of fracture, body mass index, hemoglobin, albumin, and creatinine) and competing risks regression models accounting for death as a competing endpoint.

Results: Baseline mean \pm SD serum sodium level in the overall cohort was 139.7 ± 2.9 mEq/L, and among patients with available data, median metacarpal BMD T-score was -2.05 (IQR, -3.35 to -0.99). Serum sodium levels were not associated with metacarpal BMD T-score in unadjusted or adjusted models. During a median follow-up of 5.4 years (IQR, 2.5-7.0 years), 712 patients died; 660 experienced clinical fractures; and 64 experienced asymptomatic vertebral fractures as estimated by height loss. In adjusted Cox regression models, lower serum sodium levels were associated with mortality (HR, 1.06 per 1 mEq/L lower; 95% CI, 1.03-1.09) but not incident clinical fracture (HR, 1.03 per 1 mEq/L lower; 95% CI, 0.96-1.10) or any fracture (a composite of clinical fracture and vertebral fracture). Similar results were obtained in competing risks regression models.

Conclusions: Lower serum sodium levels were associated with mortality but not BMD or incident fracture in maintenance hemodialysis patients.