

High Phosphorus Intake Is Associated with Poor Survival in Maintenance Hemodialysis Patients

Nazanin Noori, MD, PhD¹; Joel D. Kopple, MD¹; Debbie Benner, MS, RD, CSR²; and Kamyar Kalantar-Zadeh, MD, MPH PhD^{1*}
 (1)Harold Simmons Center for Chronic Disease Research & Epidemiology, LABioMed at Harbor-UCLA, Torrance, CA; (2)DaVita Inc., Lakewood, CO

INTRODUCTION

Recent observational data relate hyperphosphatemia to a 20–40% increased risk of all-cause and cardiovascular death in maintenance hemodialysis (HD) patients (pts), but little evidence is available concerning a possible association with dietary phosphorus (P) intake.

We examined whether increased P intake is related to greater death risk in HD pts.

METHODOLOGY

- We examined the association between dietary P intake and death in a 5-yr cohort of 224 randomly selected HD pts from 8 DaVita clinics, using Cox models.
- Block's *Food Frequency Questionnaires* (FFQ) were used to assess dietary intake during first 6 months of the study.
- Case-mix adjustments: age, sex, race, comorbidity, vintage, insurance, marital, smoking, Kt/V
- Nutritional status and MICS adjustments (Diet/MICS): protein, energy and K intakes, BMI, EPO dose, serum albumin, creatinine, calcium, P and ferritin, TIBC, hemoglobin, WBC, % lymphocytes, nPNA
- Inflammatory adjustments: CRP, IL-6 and TNF-alpha.

RESULTS

- Mean (\pm SD) age was 55 \pm 14.yrs
- Mean (\pm SD) Vintage was 35 \pm 29 months
- Subjects were
 - 48% women,
 - 25% Black,
 - 53% Hispanics and
 - 62% diabetics.
- Estimated dietary P intake, expressed in tertiles, was
 - <532 [reference],
 - 532-777 and
 - >777 mg/dL

Table 1. Hazard Ratio by Phosphorus Intake

	Unadjusted	Case-mix (CM)	CM/Diet/MICS	CM/Diet/MICS/ inflammation
1st tertile	1.00 (reference)	1.00 (reference)	1.00 (reference)	1.00 (reference)
2nd tertile	1.49 (0.84-2.64), p=0.16	1.67 (0.92-3.04), p=0.09	1.65(0.81-3.34) p=0.16	1.82 (0.86-3.83) p=0.11
3rd tertile	1.84 (1.06-3.19) p=0.02	1.96 (1.10-3.49) p=0.02	2.10 (0.81-5.43) p=0.12	2.45 (1.01-6.50) p=0.04

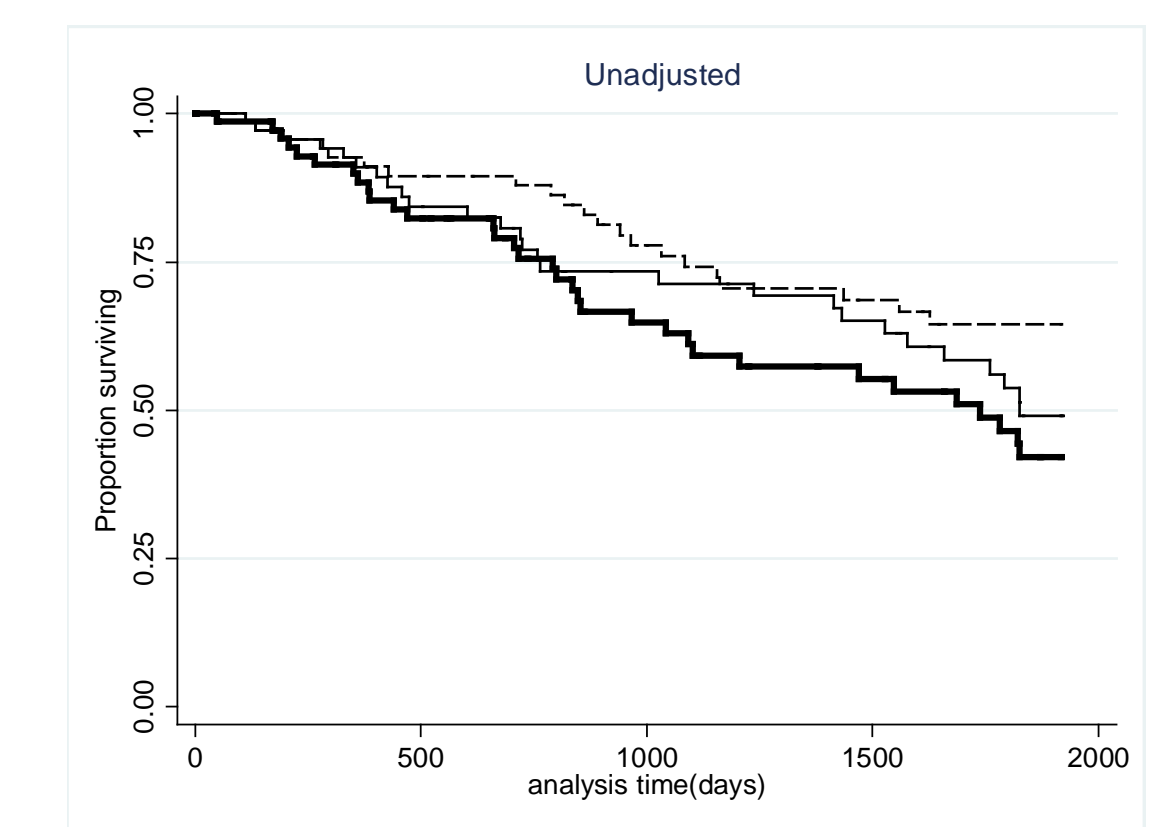
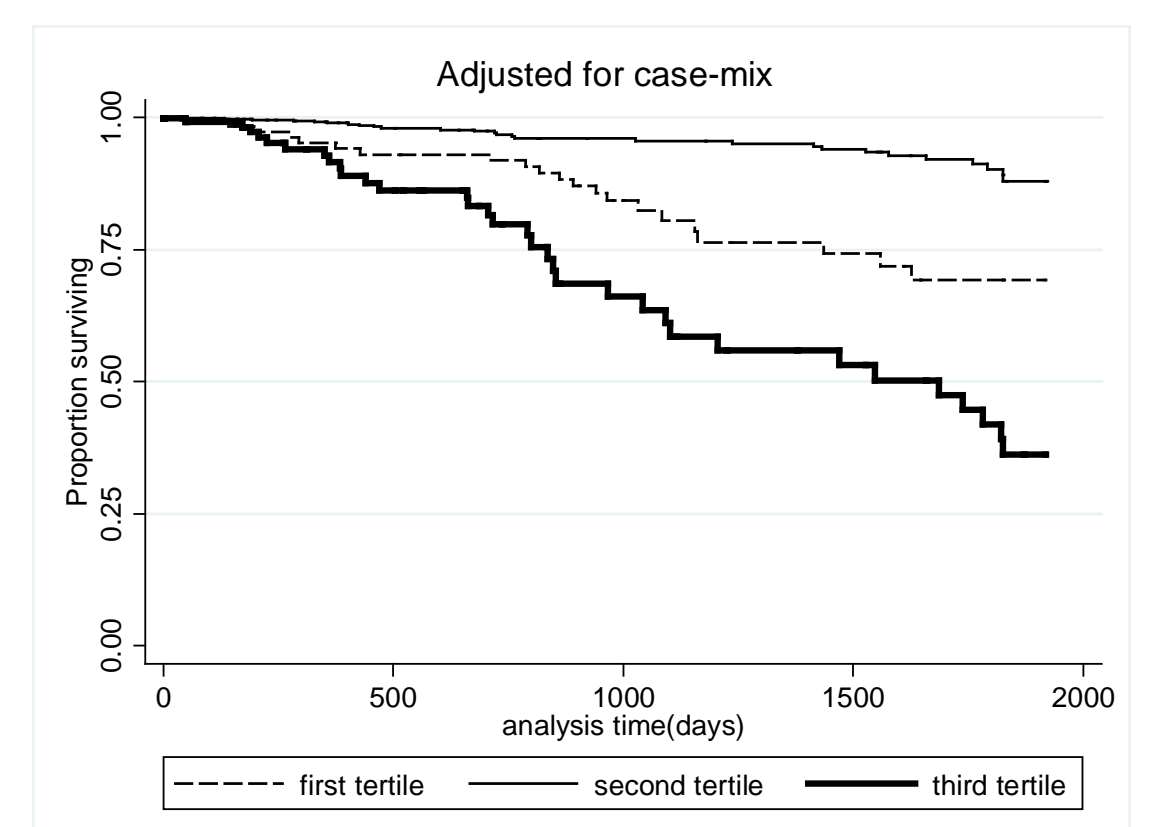


Figure 1. Kaplan-Meier proportion of surviving HD patients after 5 yrs of observation according to the tertiles of P intake in 224 HD patients (Left: Unadjusted. Right: adjusted for case-mix).



CONCLUSIONS

- The death hazard ratio was incrementally higher from the 1st to the 3rd highest tertile of P intake in the unadjusted model as well as case-mix, & nutritional status and MICS & inflammatory measures adjusted models (Table 1).
- Hazard ratio tended to increase incrementally with P intake and was significantly greater in the 3rd tertile as compared to the first tertile of P intakes in 3 of the 4 models (Table 1 and Figure 1).

KEY LEARNINGS

- ✓ Higher dietary P intake by HD patients is associated with increased mortality even after adjustment for potential confounders including serum P.
- ✓ This study reinforces the hypothesis that controlling dietary P may contribute to improving outcomes.

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*Correspondence: kamkal@ucla.edu