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Impact of phosphate variability in patients undergoing hemodialysis

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Objectives : There were few studies investigating the relationship between phosphate level variability and clinical prognosis in hemodialysis (HD) patients. This study aims to evaluate the effect of phosphate level variability on clinical outcomes in maintenance HD patients using a population-based cohort.
Methods : Dataset from patients who underwent periodic HD quality assessments and their claims data were analyzed (n = 50,225). The phosphate variability was calculated using the residual standard deviation derived from a within-subject linear regression model with six phosphate values for each patient. Participants were divided into the four quartile groups based on the phosphate variability. We created the balanced cohort for the 4 groups using generalized boosted models for the following variables.
Results : After weighting, the residual SDs of phosphate were 0.35 ± 0.00 mg/dL (Q1), 0.57 ± 0.00 mg/dL (Q2), 0.79 ± 0.00 mg/dL (Q3), and 1.22 ± 0.00 mg/dL (Q4). The mean follow-up duration in the weighted cohort was 50 ± 0.2 months for all quartiles. Multivariable Cox regression analysis showed that patients in the Q4 group had a greater HR for all-cause mortality and dementia compared to the Q1 group. The Q1 group had the lowest HR for dementia among the four groups. These results were consistent with the trends observed in the spline curves. However, no association was found between CVE and phosphate variability groups.
Conclusions : Our study found an association between high phosphate variability and both all-cause mortality and dementia.