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The association of serum mineral parameters with mortality in hemodialysis patients: Data analysis from Korean end-stage renal disease registry

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Objectives: Various guidelines recommend to maintain target levels of serum calcium, phosphorus and parathyroid hormone to reduce mortality and morbidities in chronic kidney disease patients. We investigated the association of mineral metabolism parameters with mortality in Korean hemodialysis patients to identify optimal targets in Korean population.

Methods: Among hemodialysis patients who were registered to 'Insan Memorial End-Stage Renal Disease Registry' of the Korean Society of Nephrology between March 2012 and June 2017, patients whose serum calcium, phosphorus, and intact parathyroid hormone (iPTH) were measured at enrollment were included. Subjects were divided into quintiles according to their each of serum calcium, phosphorus, and iPTH levels, which were analyzed for the association with all-cause mortality. We also evaluated the association between the numbers and combinations of targets achieved according to the KDOQI guideline and mortality.

Results: Among total 21,433 patients, 3,135(14.6%) patients died during the 24.8±14.5 months follow-up duration. The mean serum corrected calcium, phosphorus, and iPTH level were 9.02±0.83 mg/dL, 4.91±1.62 mg/dL, 213.2±231.0 pg/mL, respectively. After multivariable adjustment, 1st quintile of corrected calcium group was significantly associated with lower mortality(HR, 0.84; 95% CI, 0.71-0.99; *P*=0.003) and 5th quintile of corrected calcium group was significantly associated with higher mortality(HR, 1.39; 95% CI, 1.20-1.61; *P*<0.001) compared with 3rd quintile group. For phosphorus, only lowest quintile was significantly associated with increased mortality(HR, 1.24; 95% CI, 1.08-1.43; *P*=0.003) compared with 3rd quintile. The lowest(HR, 1.18; 95% CI, 1.02-1.36; *P*=0.026) and highest quintile of iPTH(HR, 1.24; 95% CI, 1.05-1.46; *P*=0.013) were associated with increased mortality. In terms of target counts achieved, patients who achieved none of the mineral parameter targets had significantly higher mortality than those who achieved all of the 3 targets(HR, 1.37; 95% CI, 1.12-1.67; *P*=0.003).

Conclusions: In Korean hemodialysis patients, high serum calcium, low phosphorus, and high and low iPTH levels were associated with increased all-cause mortality.