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Optimal Serum Phosphorus and Calcium Levels for Survival in Korean Hemodialysis Patients: A Nationwide Cohort Study

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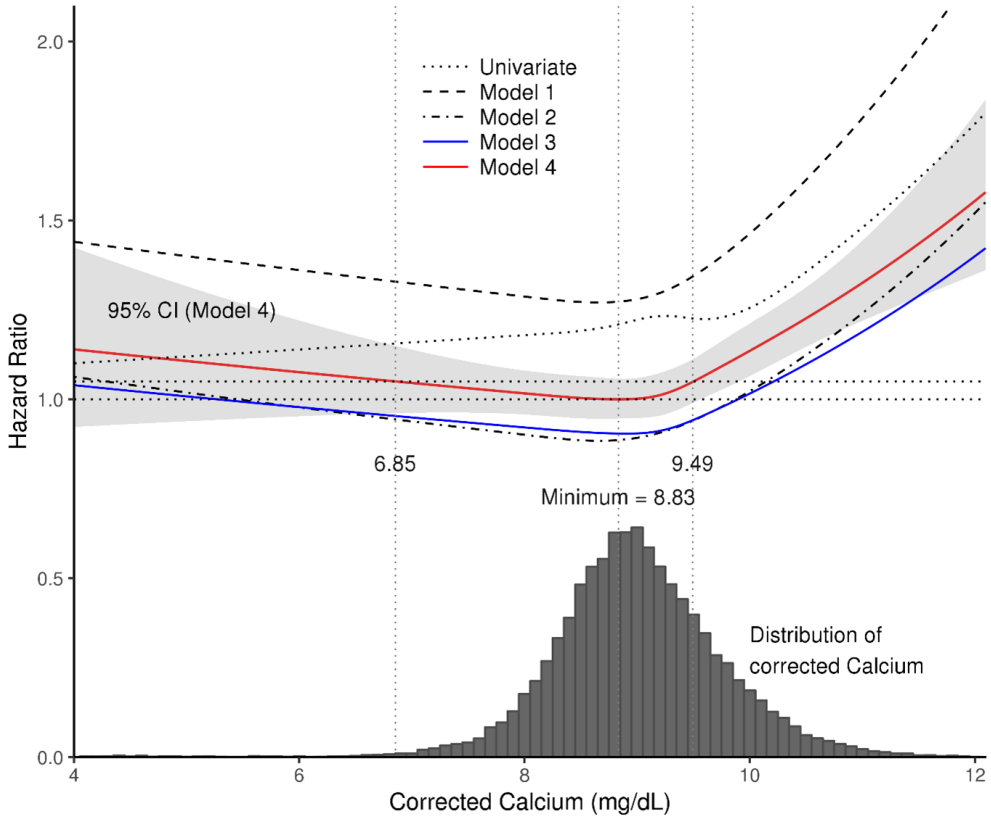
Objectives : Abnormalities in serum phosphorus and calcium have been associated with poor survival in hemodialysis (HD) patients. This study evaluated their association with all-cause mortality to determine optimal target ranges in Korean HD patients.
Methods : We analyzed data from the 2015 HD Quality Assessment and National Health Insurance Service claims database to collect demographic and clinical information. Cox proportional hazards models assessed the relationship between serum phosphorus, corrected calcium, and all-cause mortality. Cox regression analysis was conducted to identify serum calcium and phosphorus concentrations associated with the lowest hazard ratio and to determine the range corresponding to a mortality risk <5% (reference range).
Results : Among 34,877 patients (58.8% male; mean age 60.2 ± 12.8 years), diabetes and hypertension were present in 61.5% and 84.9%, respectively. Among them, 12,477 (36.7%) died during a mean follow-up of 53.7±23.0 months. Elevated serum calcium were associated with increased mortality, while lower levels were not associated with mortality. Serum phosphorus demonstrated a U-shaped relationship with mortality, with both hypo- and hyperphosphatemia associated with increased mortality. The levels for the lowest mortality risk were 4.0 mg/dL for phosphorus and 8.8 mg/dL for calcium (Figure 1 and 2). The ranges associated with a mortality risk of less than 5% were 3.3–4.8 mg/dL for serum phosphorus and 6.8–9.5 mg/dL for serum calcium. In patients with calcium levels exceeding the reference range, the HR was 1.19 (95% CI, 1.13–1.25). For serum phosphorus, the HR was 1.12 (95% CI, 1.05–1.19) below and 1.11 (95% CI, 1.06–1.16) above the reference range.
Conclusions : In Korean hemodialysis patients, elevated serum phosphorus and calcium levels were significantly associated with increased all-cause mortality. These findings suggest that maintaining serum phosphorus and calcium levels within the identified optimal ranges may improve survival outcomes in HD patients.

Figure1_CaP_mortality.png



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