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Hyperphosphatemia and Risks of Acute Kidney Injury, End-Stage Renal Disease, and Mortality in Hospitalized Patients

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Objectives: Hyperphosphatemia is an important concern in patients with chronic kidney disease regarding vascular calcification and mineral bone disorder. However, the clinical implication of the serum phosphorus in the risk of acute kidney injury (AKI), end-stage renal disease (ESRD), and mortality remains unresolved.

Methods: A total of 20,686 patients (aged ≥ 18 years; without ESRD) who admitted to the hospital were retrospectively reviewed. Patients were categorized into the quartiles of serum phosphorus which was measured at the time of admission. The odds ratios (ORs) for AKI and hazard ratios (HRs) for ESRD and all-cause mortality were calculated after adjustment of multiple covariates.

Results: The ranges of serum phosphorus were < 2.9 mg/dl, 2.9–3.3 mg/dl, 3.4–3.8 mg/dl, and ≥ 3.9 mg/dl from the 1st to the 4th quartile groups. AKI developed in 2,319 patients (11.2%). The higher quartile groups had higher ORs of AKI than the 1st quartile group as follows: 1.10 (0.954–1.262) in the 2nd quartile; 1.33 (1.142–1.543) in the 3rd quartile; and 2.45 (2.142–2.809) in the 4th quartile. The 4th quartile group had a risk of ESRD compared with the 1st quartile with the OR of 5.05 (3.192–7.987). During the maximum follow-up period of 5 years, 3675 patients (17.8%) died. The 4th quartile group had a higher HR of mortality than the 1st quartile group (1.32 [1.194–1.452]).

Conclusions: Hyperphosphatemia is related with the risk of AKI, ESRD, and mortality in hospitalized patients. Accordingly, it may be needed to monitor serum phosphorus level although the patients do not have chronic kidney disease.