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The Impact of Alkaline Phosphatase on All-Cause Mortality in Patients with Diabetic Kidney Disease: A Multi-Nation Retrospective Cohort Study

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Objectives : Alkaline phosphatase (ALP) is a glycoprotein crucial for regulating vascular calcification. Elevated levels of ALP have been linked to vascular diseases and increased mortality risk. Considering the significant association between diabetes and vascular complications, this study aims to evaluate the impact of ALP levels on all-cause mortality in patients with diabetic kidney disease (DKD).
Methods : Utilizing data from a multi-ethnic, multi-center retrospective cohort from Taiwan and Korea, spanning January 2001 to December 2021, we included patients aged ≥18 years with DKD. ALP levels were categorized into quartiles, with the first quartile serving as the reference. A Cox-proportional hazard model was used to assess the impact of ALP on all-cause mortality, adjusted for age, sex, systolic blood pressure, body mass index, comorbidities (such as hypertension, cardiovascular disease), and laboratory variables (including hemoglobin, serum albumin, uric acid, total cholesterol, and estimated glomerular filtration rates [eGFR]).
Results : The study included 10,648 patients with DKD, with a mean age of 63.4±12.6 years. Among these patients, 59.4% were male, and 66.6% and 15.6% had hypertension and cardiovascular disease, respectively. The mean eGFR was 51.9±31.2 mL/min/1.73m^2, with 26.6% of the patients having an eGFR <30 mL/min/1.73m^2. Patients in the highest quartile of ALP faced a significantly increased risk of all-cause mortality (adjusted hazard ratio [aHR] 1.72, 95% confidence interval [CI] 1.49-1.99). Subgroup analysis, based on age >65, sex, eGFR <45, and BMI >25, indicated that the highest quartile of ALP consistently increased mortality risk across different conditions. The impact of ALP was notably significant in males (aHR 1.90, 95% CI 1.58-2.28) and patients with an eGFR <45 (aHR 1.81, 95% CI 1.53-2.13).
Conclusions : Elevated ALP levels are associated with a higher risk of all-cause mortality in patients with diabetic kidney disease, underscoring the importance of ALP as a prognostic marker in this population.