Effects of alkaline phosphatase on renal function deterioration and all-cause mortality

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Objectives: Serum alkaline phosphatase (ALP) has been associated with increased mortality in hemodialysis but the evidence for this relationship is still lacking in chronic kidney disease (CKD) population. Additionally, we evaluated the relationship between ALP and end-stage renal disease (ESRD) progression.

Methods: We enrolled patients who visited the nephrology clinic of Boramae medical center from 2011 to 2016. Data were collected from electrical medical record. ALP was divided into 2 groups according to median value (<76 IU/L and ≥76 IU/L). Estimated glomerular filtration rates were calculated by Modification of Diet in Renal Disease (MDRD) study equation (MDRD-GFR). ESRD progression was defined as the onset of dialysis requiring long term maintenance dialysis. We conducted Cox analysis to evaluate the association between all-cause mortality and ESRD progression. Age, sex, MDRD-GFR, hypertension, and diabetes were included as covariates.

Results: Total 5,473 patients were included. The mean age was 58.0 ± 17.2, and 47.5% were men. The median ALP was 76 IU/L and mean MDRD-GFR was 72.6 ± 32.0. The mean follow-up duration was 26 months and there were 688 (12.6%) all-cause deaths. When expressed as a dichotomous factor, the high ALP group was associated increased all-cause mortality and when compared with the low ALP group (adjusted odds ratio [OR] 1.600, 95% confidence interval [CI] 1.360-1.882, P<0.001). However, this tendency was not observed in ESRD progression (OR 1.221, 95% CI 0.993-1.501, P=0.058)

Conclusions: Higher level of serum alkaline phosphatase are associated with increased mortality but not with ESRD progression. Further studies are needed to clarify the potential mechanism for this relationship.