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CKD & associated complications

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Increased serum alkaline phosphatase predicts rapid decrease of glomerular filtration rate in patients with normal renal function/early chronic kidney disease

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Background: High alkaline phosphatase (AlkP) has been associated with increased mortality and coronary calcification in many subgroups, but the impact of AlkP on decline in glomerular filtration rate (GFR) is unknown.

Methods: We retrospectively included patients with normal renal function or early chronic kidney disease who underwent cardiac CT angiography (CCTA) from March 2008 to June 2013 in single medical center. We gathered the following data from available medical records of patients: demographics, baseline laboratory findings at the time of CCTA scan, serum creatinine data of 0, 3, 6, 12, and 24 month (± 3 weeks), and follow-up major cardiovascular events till February 2016.

Results: Of 2,392 patients, there were 220 (15%) patients who showed decreases in GFR above 25% within 2 years. In multivariate Cox regression analysis, high alkaline phosphatase (>120 IU/L) was a definite predictor for GFR decrease even after adjusting following variables: age, gender, coronary calcium score (CCS), liver enzymes, serum albumin, CRP, GFR at the time of CT scan (adjusted HR 2.711, 95% CI 1.238-5.937, $P=0.013$). Mean decline difference of GFR within 2 years between $ALP \geq 120$ IU/L and <120 IU/L was $3 \text{ ml/min}/1.73\text{m}^2$ ($P=0.045$). On the other hand, high alkaline phosphatase (>120 IU/L) had little influence on major cardiovascular events (OR 1.106, 95% CI 0.516-2.373, $P=0.795$), and CCS was not related to elevation of serum alkaline phosphatase ($P=0.367$) within short span of years.

Conclusion: We found that elevated serum alkaline phosphatase in normal renal function/early chronic kidney disease can predict more decrease in GFR, which mechanism may not related to arterial calcification.

Keywords: alkaline phosphatase, chronic kidney disease, glomerular filtration rate