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Perivascular fat attenuation index in coronary computed tomography angiography is associated with long-term outcomes in patients with end-stage renal disease

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Objectives: Perivascular fat attenuation index (FAI) of coronary artery represents the degree of coronary inflammation. High coronary artery FAI in computed tomography angiography (CTA) is associated with increased all-cause and cardiac mortality in general population. However, the ability of the perivascular FAI using coronary CTA to predict long term outcome in chronic kidney disease (CKD) patients is unknown.

Methods: This is a single center retrospective study. We analyzed coronary FAIs on CTA for CKD including patients with end stage renal disease (ESRD). The patients with percutaneous coronary intervention or coronary artery bypass graft were excluded. Mapping and analysis of perivascular FAI were performed around proximal three major coronary arteries. We assessed the prognostic value of FAI of CTA for long-term mortality (data from the Korean National Statistical Office) with Cox regression models, adjusted for age, sex, dialysis vintage, and clinical parameters.

Results: Between January 2012 and June 2018, 268 CKD patients were included. Mean age of this cohort was 64.5 ± 12.0 years, and 132 (49.3%) participants were men. 109 (44.7%) participants has diabetic kidney disease, and 179 (66.4%) participants were on hemodialysis. Median follow-up after coronary CTA was 29.2 (15.1–46.3) months. During follow-up, there were 43 deaths. The optimum cut-off value of FAI around the left anterior descending artery (LAD) was ascertained as -65.5 Hounsfield unit. The perivascular FAI around the LAD was not significantly associated with adjusted risk of all-cause mortality in CKD patients (hazard ratio, 2.08; 95% CI, 0.94–3.51). In ESRD subgroup, the high perivascular FAI group has higher adjusted risk of all-cause mortality compared to low perivascular FAI group (hazard ratio, 2.26; 95% CI, 1.11–4.61).

Conclusions: The perivascular FAI around LAD predicts the long-term mortality in patients with ESRD. This could provide the chance of early primary intervention in ESRD patients.