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Extracellular Fluid Excess Is Significantly Associated with Coronary Artery Calcification in Kidney Transplant Recipients

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Objectives : Coronary artery calcification (CAC) is associated with increased mortality in CKD patients and does not regress after kidney transplantation. Extracellular fluid excess measured by bio-impedance analysis (BIA) is also associated with adverse clinical outcomes in kidney transplant recipients (KTR). Present study is aimed to identify the relationship between extracellular volume status and CAC in KTR.

Methods : Data were retrieved from the Cardiovascular and Metabolic Disease Etiology Research Center-High Risk (CMERC-HI, NCT02003781) that is a prospective observational cohort study in patients at high risk of cardiovascular disease. Between November 2013 and December 2016 a total of 123 KTR was included. Extracellular volume status was assessed by BIA and extracellular fluid excess (EFE) was defined if the ratio of extracellular water and total body water (ECW/TBW) was more than 0.390. CAC was measured by multidetector CT and CAC ≥400 was considered as a calcified coronary artery.

Results : The mean age was 50.8± 10.3years and 79 (64.2%) were men, and the mean duration of kidney transplantation was 42.8 (25.4 – 88.8) months. Fifty-four (43.9%) patients showed excess with body fluid. Compared with non-EFE group, EFE group was older and had a longer time on KT, a longer duration of previous dialysis, and a lower estimated glomerular filtration rate (eGFR). The CACS [244.8 (13.1 – 909.3) vs. 30.2 (0.0 – 213.3), P = 0.002] and the proportion of calcified coronary artery [22 (40.0%) vs. 12 (17.6%), P =

0.006] were significantly higher in the EFE group. In logistic regression analysis, EFE was significantly associated with calcified coronary artery [odds ratio (OR); 3.111, 95% confidence interval (CI); 1.364 –7.095, P = 0.007]. Moreover, EFE was found to be independently associated with calcified coronary artery after adjustment for multiple confounders (OR 4.327, 95% CI; 1.309 – 14.298, P = 0.016).

Conclusions : Our study demonstrated that extracellular volume excess was significantly associated with CAC in KTR. Present study suggests that EFE might be a risk factor for cardiovascular disease in KTR.

Keywords : extracellular fluid excess, coronary artery calcification, kidney transplantation