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Promoting Sustainable Kidney Health: The Asia-Pacific and Beyond

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Total Kidney Volume as a Risk Factor of Outcomes in Diabetic Kidney Disease (DKD)

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Objectives : DKD is a heterogeneous disease since the pathology is not homogeneous. We addressed whether height-adjusted total kidney volume (HtTKV) or kidney size can be used as a risk stratification tool.
Methods : This retrospective study enrolled 602 subjects with DKD. The associations of HtTKV (tertiles of HtTKV) with incident cardiovascular diseases (CVD) and kidney composite outcome of sustained 30% reduction from baseline eGFR or dialysis were analyzed by Cox regression.
Results : Mean age was 71, 65% were male, and median eGFR was 40 mL/min/1.73 m^2. Smaller HtTKV was associated with older age and lower eGFR. Since HtTKV is dependent on eGFR, we calculated the z-score of HtTKV in DKD accounting for eGFR using IgA nephropathy of 192 patients as a reference. The z-score allows us to assess how much HtTKV in DKD deviates from the average HtTKV in IgA nephropathy at the same level of eGFR. During a median follow-up of 4.3 years, 149 events of CVD and 116 events of renal outcome were observed. Larger HtTKV was associated with a higher incidence of CVD (adjusted HR: 1.99 [95% CI:1.11-2.83] T3 vs T1) (Figure 1). This association is driven mainly by congestive heart failure (CHF). The associations of z-score with the kidney composite outcome and annualized eGFR slope were inverse J-shaped after adjustment for confounders including urine protein creatinine ratio (Figure 2).
Conclusions : The observed high risk of CVD and DKD progression in patients with large kidneys can be explained by more severe microangiopathy often referred to as classical diabetic nephropathy. The observed low eGFR slope with small HtTKV might stem from severe atherosclerotic changes in the kidney (macroangiopathy). Kidney volume in DKD patients can be used as a predictor for the development of CVD and kidney outcome, independent of eGFR and albuminuria.

fig1.png

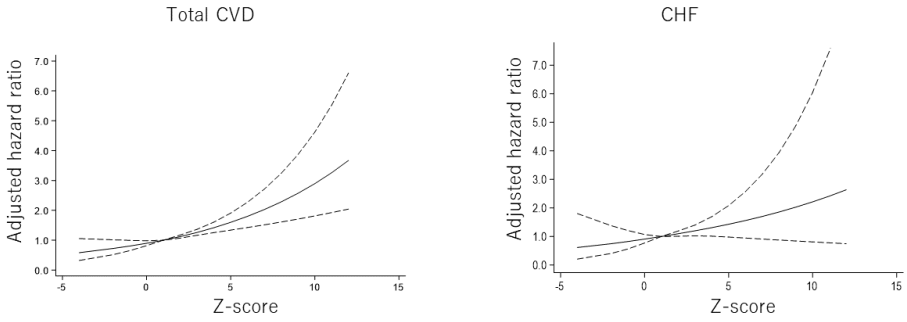

Figure 1: Association of total CVD and CHF with HtTKV Z score (N=602)
Data were adjusted for age, sex, eGFR, UPCR, SBP, Hb, HbA1c, Alb, CAD history and CHF history.

fig1.png

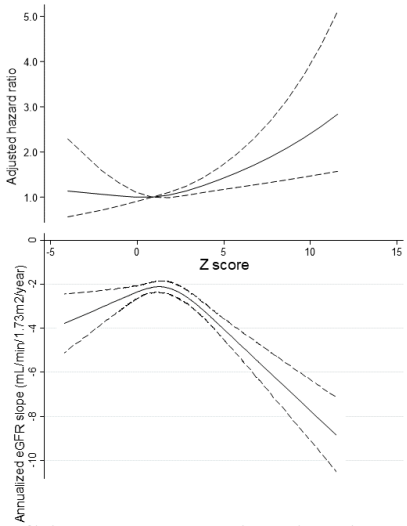

Figure 2: Association of kidney composite outcome and eGFR slope with HtTKV Z score (N=602)
Data were adjusted for age, sex, eGFR, UPCR, SBP, Hb, HbA1c, Alb, CAD history and CHF history.