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Total kidney volume and albuminuria in youth with type 1 and type 2 diabetes

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Objectives : Total kidney volume (TKV) has been identified as a potential biomarker for assessing early kidney injury. People with diabetes are thought to exhibit larger TKV early in their disease course, yet differences between youth with type 1 diabetes (T1D) and type 2 diabetes (T2D) remain incompletely explored. This study sought to examine differences in TKV between youth with T1D and T2D and associations with urine albumin-to-creatinine ratio (UACR).

Methods : 120 youth and young adults (mean age of 21±6 years, median age of 19.6± (9,37)) diabetes duration of 5.1 (0.2, 28.2) years, median UACR 7.5 (1.4, 5790) mg/g, 42% T1D) had TKV (ml) assessed by kidney MRI by averaging left and right KV and were included in this analysis. We also calculated height-adjusted TKV (htTKV, ml/m). Welch two sample t-tests was used to assess TKV differences between T1D and T2D and Spearman correlation was used to examine the associations among TKV, htTKV and UACR.

Results : The height adjusted mean TKV was greater in T2D vs. T1D (108.1±24.4 vs. 97.7±22.1 mL/m, p=0.02). HtTKV correlated positively with UACR (r: 0.25, p=0.01).

Conclusions : Youth with T2D exhibited higher TKV compared to participants with T1D, independent of height. Higher htTKV associated positively with albuminuria in youth with diabetes. Next steps include evaluating the impact of sexual maturation on longitudinal changes in TKV in youth with T2D.

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Descriptive Statistics of all Participants for Mean Kidney Analyses

Characteristic	N = 120 ¹
Sex	
Female	72 (60%)
Male	48 (40%)
Age (years)	
Mean (SD)	21.05 (6.39)
Median (IQR)	19.59 (15.93, 25.59)
Group	
Type 1 Diabetes	50 (42%)
Type 2 Diabetes	70 (58%)
Diabetes Duration (years)	
Mean (SD)	8.29 (7.67)
Median (IQR)	5.14 (1.78, 14.50)
N Missing	8
Height (m)	
Mean (SD)	1.70 (0.09)
Median (IQR)	1.70 (1.64, 1.77)
N Missing	5
Urine Albumin-Creatinine Ratio	
Mean (SD)	82.08 (567.45)
Median (IQR)	7.50 (4.40, 18.37)
N Missing	15
Mean Kidney Volume (mL)	
Mean (SD)	176.98 (43.37)
Median (IQR)	168.08 (145.40, 202.53)
Height Adjusted Mean Kidney Volume (mL/m)	
Mean (SD)	103.69 (23.94)
Median (IQR)	99.11 (86.68, 114.80)
N Missing	5
Mean Kidney Volume Measure Type	
Manual	16 (13%)
Non-Manual	104 (87%)
¹ n (%)	