II

Serum Fibroblast Growth Factor (FGF) 21 Associated with Renal Sinus Fat Increase Independent of Total Intraabdominal Obesity

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Introduction. Pathways through which obesity might cause renal disease are not well understood. Recent studies have associated ectopic lipid accumulation in the kidney with obesity-related renal disease. Human studies indicate that circulating levels of FGF21 increased in obese individuals. FGF21 was found to be closely associated with renal dysfunction in end-stage renal disease subjects.

Aim. The aim of the study is to hypothesise whether renal sinus (RS) fat volume may be independently associated with the increased level of FGF21.

Material and Methods. The study included 110 subjects (60/50 F/M; mean age 39.8 ± 5.8). CT images were captured and RS fat accumulation was measured using the 3D-Doctor software. Both kidneys and RS fat were measured, and ratio left kidney sinus fat/left kidney (LS/LK) and right kidney sinus fat/right kidney (RS/RK) were calculated. Intraabdominal (IA) fat volume was measured at the level of renal hilus. FGF21 serum level was detected by ELISA assay. Partial rank correlation was used to adjust the association between LS/LK, RS/RK and FGF21 after accounting for the IA fat volume. According on sex-specific 75th percentiles of FGF21 levels each of LS/LK and RS/RK ratios were divided into two groups (Group $_{left}$1 and Group $_{left}$2 / Group $_{right}$1 and Group $_{right}$2). To compare the groups, Mann-Whitney U-test was used.

Results. FGF21 correlated with both LS/LK and RS/RK ratios ($r = 0.50$, $p < 0.001$; and $r = 0.45$, $p < 0.05$). There was a significant ($p < 0.05$) increase of both LS/LK (Group $_{left}$1 : 0.0075 and 0.0019 to 0.0145 and Group $_{left}$2 : 0.0142 and 0.0077 to 0.0332)[1] and RS/RK (Group $_{right}$1 : 0.0027 and 0.0003 to 0.0051 and Group $_{right}$2 : 0.0084 and 0.0017 to 0.0311)* ratios when data were divided according to on sex-specific 75th percentiles (234.32 pg/ml) of FGF21.

Conclusions. Taken together, these results suggest that serum FGF21 level may be increased in individuals with reduced renal function because of the increased fat accumulation in the renal sinuses.

Funding. *Research relating to this abstract was funded by the European Social Fund within the project "Support for Doctoral Studies at University of Latvia and by the grant No. 2014.10-4/VPP-5/16 BIOMEDICINE of the framework of the Latvian National Program".*

[1] Data are presented as (median and interquartile (25th to 75th) range)