Adipose tissue surrounding the kidney and its impact on coronary artery disease

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Background: Growing evidence suggests that visceral adipose tissue has systemic and local impact for the development of cardiovascular disease. Previously, we reported that epicardial adipose tissue, as one of visceral fat, was a risk factor for the development of coronary artery disease (CAD). However, the association between another visceral adiposity kidney fat and CAD remains unclear.
Purpose: In this study we aimed to clarify whether there exists link between adipose tissue surrounding the kidney and CAD among patients.
Method: The study population consisted of 201 consecutive patients who underwent 320-slice multi-detector computed tomography (MDCT) coronary angiography. Study subjects were divided into the CAD (=1 coronary artery stenosis of = 50%) and non-CAD groups. Adipose tissue surrounding the kidney were quantified by the computed tomography and peri-renal fat volumetric measurements were performed on axial views by manually placing the Region of Interest (ROI) on the renal fascia. The peri-renal fat area of each slice was summed and multiplied by the slice thickness and number of slices to determine the total peri-renal fat volume. Adipose tissue was determined as the density range was -190 to -30 Hounsfield unit. Peri-renal fat volume were indexed by body surface area (BSA).
Results: The mean age was higher in CAD group than those in non-CAD (66 ± 11 vs. 71 ± 10 years, p=0.005). The diabetes, hypertension and hyperlipidemia were significantly prevalent in CAD comparing to non-CAD group. BSA adjusted Peri-renal fat volume was significantly larger in CAD than those in non-CAD (43 ± 27 vs. 60 ± 39 ml/m²). Linear regression analysis showed that BSA adjusted peri-renal fat volume was significantly correlated with visceral fat area (VFA) (R=0.729, p<0.001). Multiple regression analysis for estimating CAD showed that BSA adjusted peri-renal fat volume was a predictor of CAD after adjusting for confounding factors which including age, gender, body mass index, smoking, hypertension, hyperlipidemia, diabetes and VFA (Adjusted R²=0.201, p<0.001); In addition, in the above traditional risk factors model even when the VFA was replaced by the eGFR<60 ml/min/1.73m², the BSA adjusted peri-renal fat volume still keep a significance for predicting the CAD in the multivariate analysis(Adjusted R²=0.198, p<0.001).
Conclusion: Peri-renal fat volume might be a predictor of CAD. Kidney fat at least partially may contributes to the development of CAD by impaired kidney function.