Clinical significance of the periaortic adipose tissue inflammation in patients with abdominal aortic aneurysms

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Background: Recent studies have reported the association between periaortic adipose tissue volumes identified by multi-detector computed tomography (MDCT) and the periaortic adipose tissue inflammation (PATI) identified by positron emission tomography, which may suggest the link between perivascular inflammation and aortic dilation. However, clinical significance of the PATI identified by MDCT remains elusive in patients with asymptomatic abdominal aortic aneurysm (AAA).

Methods: A total of 77 patients with AAA (diameter >30mm) who underwent the initial and follow-up MDCT examinations were studied retrospectively. PATI was assessed by the crude analysis of the mean CT attenuation value (–190 to –30 Hounsfield units; higher values indicating inflammation). The AAA progression (AP) was defined as the growth of AAA diameter >5.0mm/year from the initial to follow-up. Univariate and multivariate logistic regression analysis were performed to determine the predictors for AP.

Results: AP was observed in 19 (24.7%) patient, the median initial AAA diameter was 38.9 (32.7–42.9) mm, and the median progression of AAA diameter was 3.1 (1.5–4.9) mm/year. The initial AAA diameter (odds ratio [OR]: 1.16; 95% confidence interval [CI]: 1.05–1.28; p-value=0.001) and the initial PATI (OR: 1.12; 95% CI: 1.05–1.20; p-value=0.004) were independent predictors of AP. PATI of –71.08 at initial MDCT and the initial AAA diameter of 37.7mm were the best cut-off value to predict AP. Receiver operating characteristic curve analysis revealed that the best cut-off values of PATI at initial MDCT and the initial AAA diameter for predicting AP were –71.08 (AUC: 0.68, 95% CI: 0.50–0.82) and 37.7 (AUC: 0.71, 95% CI: 0.59–0.84), respectively. Addition of the initial AAA diameter to PATI at initial MDCT significantly increased the accuracy for discriminating AP (net reclassification improvement; 95% CI: 0.67 [0.17–1.17]; p-value = 0.007, integrated discrimination improvement; 95% CI: 0.14 [0.04–0.24]; p-value =0.007).

Conclusions: PATI was an independent and significant predictor of aortic dilation, supporting the notion that local adipose tissue inflammation may contribute to aortic remodeling. Comprehensive assessment of MDCT including PATI evaluation may provide a highly accurate information for identifying high risk lesions potentially leading to future AAA rupture.