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The Association between Arterial Stiffness and Increased Medial Thickness in Hemodialysis Patients

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Objectives: Arterial stiffness is an important risk factor for cardiovascular mortality and morbidity in hemodialysis patients. Several risk factors unique to ESRD, such as vascular calcification, mineral metabolism disturbance, and volume overload are suggested to play a principal role in the progression of arterial stiffness in hemodialysis patients. The transformation of vascular smooth muscle cells (VSMCs) into osteoblast-like cells seems to be a key role in the pathogenesis of medial calcification, which causes increased arterial stiffness. In this study, we aimed to investigate the correlation of arterial stiffness with increased medial thickness in hemodialysis patients.

Methods: Carotid doppler was performed by an experienced radiologist who is unaware of the aims of the study and blinded to the laboratory findings. Intimal thickness(IT) and medial thickness(MT) were separately measured using automated image-processing algorithms. For PWV measurement, Patients lie down, rest for at least 5 minutes, and prohibit smoking and coffee for 3 hours before the measurement. BaPWV is measured by recording pulse waves of both arms and both ankles from the pressure signal obtained by measuring 4-extremity blood pressure.

Results: One hundred patients were included, of whom 51 (50.5%) were men. The median age was 66 years (interquartile range 58-76 years). The median vintage of hemodialysis was 47.5 months (range 31.3-89.1 months). There were no significant differences between high MT/IT group and low MT/IT group in age, sex, hemodialysis vintage, and ESRD etiology. However, Apo A1/B ratio was significantly higher in the high MT/IT group. MT/IT was significantly associated with PWV. (hazard ratio [HR] 2.829; 95% CI 1.191-6.718, P = 0.018). After adjusting for age, sex and presence of diabetes, MT/IT ratio was independently associated with PWV (HR 3.042, 95% CI 1.125-8.230, P = 0.028).

Conclusions: MT/IT ratio was associated with baPWV. Thus increased medial thickness may be suggested as a predictor of arterial stiffness.