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

Seok-hyung Kim, Hyunsuk Kim, Gwangho Choi, Jin-eop Kim, Soyeon Jeon, Ji-su Kim, Jong-Woo Yoon

Department of Internal Medicine-Nephrology, Chuncheon Sacred Heart Hospital, Korea, Republic of

Objectives: Arterial stiffness is an important risk factor for cardiovascular mortality 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 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(MT) in hemodialysis patients.

Methods: Carotid doppler was performed by an experienced radiologist who are unaware of the aims of the study and blinded to the laboratory findings. Intimal thickness(IT) and 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 arm and both ankles from the pressure signal obtained by measuring 4-extremity blood pressure.

Results: One hundred patients were included, of whom 51 were men. The median age was 66 years (interquartile range 58-76 years). The median vintage of hemodialysis was 47.5 months (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, end-stage renal disease etiology, and type of vascular access. 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 potential predictor of arterial stiffness.