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Trabecular bone score may manifest as chronic kidney disease-mineral and bone disorder (CKD-MBD) phenotype reciprocal to major cardiovascular outcome

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Objectives:

In general population, trabecular bone score (TBS) represents bone microarchitecture and predicts fracture risk independent of bone mineral density (BMD). A few studies reported that TBS is significantly reduced in dialysis patients, but there is no data on TBS of end stage renal disease (ESRD) patients in Korea. Chronic kidney disease-mineral and bone disorder (CKD-MBD) are accompanied by increased fracture risk and cardiovascular morbidity and mortality. We investigated whether TBS is associated with comorbidity related to CKD-MBD or frailty in hemodialysis patients.

Methods: In this cross-sectional study, TBS was obtained using the TBS iNsight software program (Med-Imaps) with BMD dual energy x-ray absorptiometry (DXA) images (L1–L4) from prevalent hemodialysis patients. For frailty evaluation, Tilburg frailty indicator was used. Hand grip test and bio-impedance (InBody) were measured. Patient generated subjective global assessment (PG-SGA) was measured as nutritional assessment. History of major adverse cardiovascular event (MACE) was collected. Demographic, clinical, laboratory data were also collected.

Results:

Total 57 patients were enrolled. Mean age of population was 56.8 ± 15.9 years old. Female was 50.9%. Diabetes mellitus (DM) was 40.4% and MACE was prevalent in 36.8 %. Mean TBS value was 1.44 ± 0.10. TBS was significantly reduced in MACE group (1.48 ± 0.10 vs. 1.38 ± 0.08, $p<0.001$). Multivariable regression analysis was conducted adjusting age, sex, dialysis vintage, DM, MACE, handgrip strength, Tilburg index, phase angle and PG-SGA. Age ($r=-0.003$; $p=0.001$) and MACE ($r=-0.054$; $p=0.028$) were significant predictors of TBS.

Conclusions: TBS was associated with age and vascular disease in hemodialysis patients. TBS may manifest as phenotype of frailty, also may manifest as CKD-MBD phenotype reciprocal to MACE.