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Subclinical Liver Stiffness Measured by Transient Elastography is Closely Related with Albuminuria in Healthy Subjects: Cross-sectional Study

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Background: Recent evidences demonstrated that liver has a pivotal role in metabolic derangement, and adipokines and cytokines interplay with liver injury including hepatic steatosis and fibrosis. Since microalbuminuria is significantly associated with the presence of metabolic syndrome, we investigated that the association between subclinical liver stiffness (LS) measured by transient elastography and urine albumin-to-creatinine ratio (UACR) in relatively healthy individuals.

Methods: The study population was comprised of participants that included all subjects who underwent transient elastography at Yonsei University Health System between November 2011 and June 2015. Among 4,236 patients, we excluded 3,508 individuals who have recognized with underlying liver disease, decreased renal function, history of alcohol ingestion, or inadequate data. Finally 582 subjects were eligible for the present analysis after propensity score matching. Multiple logistic regression was performed to elucidate the association between LS and UACR in propensity score matched individuals.

Results: The mean age of the study subject was 60.8±13.6 years, and 369 (63.4%) patients were male. The median UACR was 15.4 (6.9-79.7) mg/g Cr, and the median value of LS was 4.7 (4.0-5.8) kPa. The participating subjects were divided into two groups according to the median value of log LS levels. After matched for age, gender, history of hypertension, diabetes, and estimated glomerular filtration rate (eGFR), low LS group showed significantly lower levels of fasting plasma glucose (110.4±34.3 vs. 119.9 ± 49.1 mg/dL, P=0.007), AST (20 [17-25] vs. 23 [18-31] U/L, P<0.001), ALT (18 [13-25] vs. 20 [15-30] U/L, P=0.002), hs-CRP (0.80 [0.50-2.00] vs. 1.50 [0.70-6.95] mg/L, P<0.001), and UACR (13.1 [6.3-55.8] vs. 18.4 [8.1-130.0] mg/g Cr, P=0.014), while total cholesterol (174.8±39.3 vs. 166.0±46.9 mg/dL, P=0.015) and serum albumin (4.2±0.4 vs. 3.9±0.6 mg/dL, P<0.001) showed significantly higher levels in low LS group compared with high LS group. In multiple logistic analysis, LS was significantly associated with the presence of microalbuminuria (UACR>30 mg/g Cr in a crude model (LS, 1 log increase, odds ratio [OR]=2.114, confidence interval [CI]=1.444-3.096, P<0.001). In addition, a significant association remained after adjustment for not only liver function related factors but also traditional risk (LS, 1 log increase, OR [CI]=1.797 [1.088-2.968], P=0.022).

Conclusion: Present study showed that the subclinical LS was significantly associated with the presence of microalbuminuria even in relatively healthy subjects. This finding may provide an evidence that liver dysfunction correlates with kidney injury represented by microalbuminuria.

Keywords: Albuminuria, Liver stiffness, Transient elastography