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# 만성신부전 환자에서 FibroScan으로 측정한 지방간은 대사증후군과 유의한 관계를 보인다

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윤창연, 한인미, 기연경, 한승규, 권영은, 박경숙, 이미정
오형중, 박정탁, 한승혁, 강신욱, 유태현

# Hepatic Steatosis Measured by FibroScan is Significantly associated with Metabolic Syndrome in Patients with Chronic Kidney Disease

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**Introduction:** Hepatic steatosis can be measured by controlled attenuation parameter (CAP) using FibroScan and has been known to be closely correlated with the metabolic syndrome (MS) in general population. In chronic kidney disease (CKD) patients, MS and individual components including hypertension, diabetes mellitus, dyslipidemia, and obesity were highly prevalent. Therefore, we investigated the association of CAP measured by FibroScan and presence of MS in CKD patients.

**Method:** From November 2011 to December 2014, data were collected from 468 CKD patients and analyzed by a cross-sectional method. CKD was defined by Kidney Disease Improving Global Outcomes 2011, and MS was defined using the Modified National Cholesterol Education Program (Adult Treatment Panel III) criteria. Multivariate logistic regression analysis was used to identify the independent association between CAP and MS.

**Result:** The mean age of the patients was 57.5 years and 225 patients (48.1%) were male. 404 patients (86.3%) were included in stage 1 or 2 CKD, and the mean value of CAP was 241.7 dB/m. In multivariate linear regression analysis, CAP was independently associated with body mass index (β=7.818, p<0.001), triglyceride (β=0.246, p=0.002) and estimated glomerular filtration rate (eGFR) (β=0.581, p=0.005). Total 142 (30.3%) patients had MS. In the MS group, diabetes was more prevalent (59.9 versus 25.8%, p<0.001), hemoglobin (13.1±2.4 versus 12.6±2.1 g/dL, p=0.026) and CAP (262.0±60.6 versus 232.9±49.0 dB/m, p<0.001) were significantly higher, while the eGFR (82.9±27.5 versus 91.6±26.0 mL/min/1.73m$^2$, p=0.001) was lower compared with non-MS group. Multivariate logistic regression analysis indicated that increased CAP was independently correlated with the increased risk of MS (per 1 dB/m increase, odds ratio=1.010, 95% confidence interval 1.002-1.018, p=0.014) after adjustment for confounding factors.

**Conclusion:** Increased CAP measured by FibroScan was significantly associated with an increased risk of MS in the CKD patients. These data suggested that hepatic steatosis measured by CAP could be one of the novel surrogate marker for MS in CKD patients.

**Key Words:** 만성신부전, 대사증후군, 간섬유화 검사
Chronic kidney disease, Metabolic syndrome, FibroScan