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우리나라 성인에서 혈중 납 및 카드뮴 농도와 사구체 여과율 및 단백뇨의 관계

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Association of Blood Lead and Cadmium with Glomerular Filtration Rate and Proteinuria in Korean Adults

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Purpose: The objective of this study is to evaluate the associations of blood lead and cadmium with estimated glomerular filtration rate (eGFR) and proteinuria in Korean adults who participated in the Korean National Health and Nutrition Examination Survey (KNAHNES).

Methods: Based on KNAHNES, cross-sectional study was performed to analyze the association between blood lead and cadmium levels with renal dysfunction and urine protein excretion. We defined renal dysfunction as eGFR, measured by CKD-EPI method, with < 60 mL/min/1.73m2, and proteinuria as >300 mg/day.

Results: Blood lead level and cadmium level were significantly increased in renal dysfunction group comparing with normal renal function group (lead, 2.9±0.13 μg/dL vs 2.5±0.03 μg/dL, p=0.003; cadmium, 1.6±0.11 μg/L vs 1.1±0.02 μg/L, p<0.001, respectively). Blood lead level was significantly increased in proteinuria group comparing with no proteinuria group (3.0±0.21 μg/dL vs 2.5±0.03 μg/dL, p=0.043) while blood cadmium showed no differences between two groups. This result was in good accord with multiple regression analysis with blood lead and cadmium level and eGFR. In multivariate logistic regression analysis adjusting for age and sex, blood lead and cadmium level showed higher level in the renal dysfunction group than in the normal renal function group (OR 1.344, 95%CI 1.157-1.162, p<0.05; OR 1.467, 95%CI 1.077-1.999, p<0.05, respectively). Comparing proteinuria group with no proteinuria group, odds ratio for blood lead level was 1.237 (95%CI 1.064-1.437), while no significant difference in blood cadmium level. Logistic trend of eGFR according to blood lead and cadmium showed increasing level in the higher quartiles of blood lead and cadmium (p for trend, 0.0098 and 0.002, respectively).

Conclusion: Blood levels of lead and cadmium were associated with renal dysfunction in Korean adult population. This provide important message in environmental institutional strategy for heavy metal exposure.

Key Words: 납, 카드뮴, 사구체 여과율
Lead, Cadmium, Glomerular filtration rate