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Intellectual functioning in pediatric chronic kidney disease: Results from the KNOW-Ped CKD

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Objectives: The purpose of this study was to evaluate mental disability in pediatric chronic kidney disease (CKD), and to determine whether the relationship between intellectual functioning and clinical factors in pediatric patients with CKD from the KoreaN cohort study for Outcomes in patients With Pediatric Chronic Kidney Disease (KNOW-Ped CKD).

Methods: 87 subjects who completed the intelligence test were included in this study. One of KEDI-WISC, K-WISC-III and K-WISC-IV was performed for 5-15 years old. One of K-WAIS and K-WAIS-IV were performed for 16 years or older. We analyzed the associations between the full scale intelligence quotient (IQ) scores of the intelligence test in pediatric CKD and each variable. Borderline intellectual functioning was defined as a full scale IQ scores less than 80.

Results: The mean age was 11.9 (±3.4) years, with a range in age from 4.6 to 17.5 years and the number of males was 59 (67.8%). The mean duration of CKD was 4.1 (±4.3) years, with a range of 0.0 to 15.4 years. Of our cohort, 24 (27.6%) of children had borderline intellectual functioning. Advanced stage of CKD and the duration of CKD had a significantly negative correlation with IQ (P=0.026, P=0.014, respectively). Subjects with a short stature or preterm birth history showed lower IQ (P=0.000, P=0.031, respectively). Abnormal serum level of phosphorus, medication history with vitamin D supplement, phosphate binder, uricosuric agents and sodium bicarbonate were negatively associated with IQ. Logistic regression analysis revealed that the duration of CKD, short stature and abnormal serum level of phosphorus were highly correlated with the full scale IQ in pediatric CKD (P=0.030, P=0.003, P=0.019, respectively).

Conclusions: In this study, factors causing growth impairment might be associated with IQ among pediatric CKD. In particular, patients with the longer the duration of CKD, short stature, or phosphorus imbalance require follow-up targeted at mental disability.