

Vitamin D insufficiency and deficiency in children with chronic kidney disease

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BACKGROUND AND OBJECTIVES: Hypovitaminosis D is a frequent condition in normal populations. Children with chronic kidney disease (CKD) present a high risk of developing complications due to hypovitaminosis D. Our aim was to determine the frequency of vitamin D insufficiency/deficiency in children with different stages of CKD who were followed up at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia.

DESIGN AND SETTING: University hospital-based case-control study of children followed up between March 2010 and March 2011.

PATIENTS AND METHODS: Blood was extracted from children with CKD to measure urea, creatinine, hemoglobin, calcium, phosphorus, alkaline phosphatase, intact parathyroid hormone (iPTH), and vitamin D3 levels. We calculated correlations between iPTH and vitamin D levels, and associations between vitamin D levels and CKD stages.

RESULTS: The frequency of vitamin D insufficiency/deficiency was high among the cases and controls. Children with CKD had significantly lower levels of vitamin D than their peers with normal kidney function ($P=.05$) with a mean (SD) level of 17.5 (9.9) ng/mL versus 21.0 (13.4) ng/mL for the control group. Among the children with CKD, 36 (45.0%) had vitamin D insufficiency, 24 (30.0%) had vitamin D deficiency, and 10 (12.5%) had severe deficiency. There was a positive correlation between vitamin D3 level and CKD stages (Kendall tau=0.22, $P=.003$). A significant association existed between glomerular filtration rate and vitamin D3 deficiency ($P=.002$). There was a significant negative correlation between iPTH and vitamin D3 concentrations (Spearman correlation coefficient= -0.27, $P=.01$). A significant association existed between age and vitamin D3 level ($P<.0001$).

CONCLUSION: Vitamin D insufficiency/deficiency is more frequent in children with CKD than in those with normal kidney function.

Vitamin D insufficiency and deficiency are extremely common conditions observed in normal populations, with an estimated 1 billion people affected worldwide.¹ Hypovitaminosis D is the most common cause of rickets and osteomalacia in adults and children living in the Saudi Arabia.^{2,3} There is, however, a paucity of reports evaluating the frequency of this condition in children with chronic kidney disease (CKD) living in Saudi Arabia and in other Arab countries. The aim of this study was to determine the frequency of vitamin D3 insufficiency and deficiency in children with CKD who were followed up at King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia.

PATIENTS AND METHODS

We conducted a case-control study to evaluate the vitamin D status in children with CKD who were followed up in the Pediatric Nephrology Clinic at KAUH, between March 2010 and March 2011. The Pediatric Nephrology Service at KAUH is considered a tertiary centre for pediatric nephrology in the western province of Saudi Arabia. A control population of children with normal kidney function, who visited the hospital for other reasons, was also identified. Consent was obtained from the parents of the participants prior to their inclusion in the study. The study was approved by the Biomedical Ethics Research Committee of KAUH.

For the case group, we included all children with