

말기신부전 환자에서의 비타민 D 결핍과 빈혈의 연관성

연세대학교 의과대학 내과학교실¹, 원광대학교 의과대학 내과학교실²

김영리¹, 김현욱², 권영은¹, 박경숙¹, 류한작¹, 이미정¹
오형중¹, 박정탁¹, 한승혁¹, 유태현¹, 최규현¹, 강신욱¹

Vitamin D Deficiency is Significantly associated with Anemia in End Stage Renal Disease Patients

Yung Ly Kim¹, Hyunwook Kim², Young Eun Kwon¹, Kyoung Sook Park¹
Han Jak Ryu¹, Mi Jung Lee¹, Hyung Jung Oh¹, Jung Tak Park¹
Seung Hyeok Han¹, Tae-Hyun Yoo¹, Kyu Hun Choi¹, Shin-Wook Kang¹

Department of Internal Medicine¹, Yonsei University College of Medicine Division of Nephrology
Department of Internal Medicine², Wonkwang University College of Medicine, Sanbon Hospital

Background: Anemia of chronic disease (ACD) is the most common form of anemia in chronic kidney disease (CKD) patients. Resistance to erythropoietin and cytokines which shorten red blood cell survival are known to be crucial causes of ACD in these patients. Accumulating evidence suggests that vitamin D can affect the efficacy of erythropoiesis through its anti-inflammatory action. Although both vitamin D deficiency and anemia are prevalent in CKD patients, the association between these two factors remains poorly understood in patients with end-stage renal disease (ESRD).

Methods: This study included 106 ESRD patients who were on the scheduled kidney transplantation in Severance Hospital between April 2002 and June 2004. Patients were categorized into three groups by tertiles of 25-hydroxy vitamin D [25(OH)D] levels measured within 2 weeks before transplantation (Group 1, ≥ 15.50 ng/mL; Group 2, 9.35 to 15.50 ng/mL; Group 3, < 9.35 ng/mL). Independent association between vitamin D and hemoglobin (Hb) concentrations was evaluated by multivariate linear regression analysis.

Results: The mean age was 40.9 ± 11.1 years, and 75 patients (70.8%) were male. Among the study participants, 49 patients (46.2%) were on hemodialysis, 22 (20.8%) were on peritoneal dialysis, and 35 (33%) were preemptive. Overall, the mean serum 25(OH)D levels were 13 ± 6.31 ng/mL and the mean Hb concentrations were 9.45 ± 1.76 g/dL. There was a significant trend of a decrease in Hb levels across the tertiles of 25(OH)D concentrations (mean Hb; 9.9 ± 1.7 in Group 1, 9.4 ± 1.7 in Group 2, and 9.0 ± 1.8 g/dL in Group 3, $p=0.047$). Moreover, Hb levels were positively associated with serum 25(OH)D concentrations ($r=0.30$, $p=0.002$). Multivariate linear regression analysis showed that serum 25(OH)D levels were independently associated with Hb concentrations after adjustment for age, serum calcium and phosphorus, intact parathyroid hormone, and the use of erythropoiesis stimulating agents (per 1 ng/mL increase, $\beta=0.08$, $p=0.03$).

Conclusions: Vitamin D deficiency is independently associated with anemia in ESRD patients.

Key Words: 비타민 D 결핍, 빈혈, 말기신부전

Vitamin D deficiency, Anemia, End-stage renal disease