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High serum adiponectin is associated with anemia development in chronic kidney disease: The results from the KNOW-CKD study

Hyoungnae KIM[2], Ki heon NAM[2], Seong yeong AN[2], Misol LEE[2], Min-uk CHA[2], Seohyun PARK[2], Jong hyun JHEE[2], Hae-ryong YUN[2], Youn kyung KEE[2], Jung tak PARK[2], Tae ik CHANG[1], Tae-hyun YOO[2], Shin-wook KANG[2,3], Kyu hun CHOI[2], *Seung hyeok HAN[2]

[1]Internal Medicine, National Health Insurance Service Medical Center, Ilsan Hospital, Goyang, Gyeonggi-do, Korea, [2]Internal Medicine, College of Medicine, Institute of Kidney Disease Research, Yonsei University, Seoul, Korea, [3]Internal Medicine, College of Medicine, Severance Biomedical Science Institute, Brain Korea 21 PLUS, Yonsei University, Seoul, Korea

Objectives : Adiponectin is an adipokine secreted by adipocytes and its low level is a significant risk factor of diabetes mellitus and cardiovascular disease. Recent studies have shown that adiponectin negatively associates with erythropoiesis and predicts the development of anemia in general population. In patients with chronic kidney disease (CKD), circulating adiponectin level is paradoxically elevated and the role of adiponectin is complex. Therefore, we evaluated the relationship between adiponectin and anemia in these patients.

Methods : Among 2238 patients from the KoreaN Cohort Study for Outcome in Patients With Chronic Kidney Disease (KNOW-CKD), 2113 were included in the analysis after excluding 125 who did not measure adiponectin levels. Baseline serum adiponectin levels were measured by commercially available enzyme-linked immunosorbent assay kit. Anemia was defined as a haemoglobin level of < 13.0 g/dL and 12.0 g/dL for male and female, respectively.

Results : The mean age was 53.6±12.2 years, and 1289 (61%) were male. The average estimated glomerular filtration rate (eGFR) was 50.4±30.2 mL/min/1.73m2. Serum adiponectin level was inversely associated with body mass index (BMI), eGFR, log-transformed ferritin, hepcidin and haemoglobin. In a multivariate linear regression analysis, after adjustment of age, sex, eGFR, systolic blood pressure, diabetes mellitus, BMI, Charlson comorbidity index, albumin, ferritin, hepcidin, proteinuria, use of iron replacement, and erythropoietin stimulating agent, adiponectin was negatively associated with haemoglobin ($\beta = -0.065$, $P < 0.001$). Among 1227 patients who did not have anemia at baseline, 307 patients newly developed anemia during follow up period. In a multivariate Cox regression analysis after adjustment of

confounders, high adiponectin level was significantly associated with an increased risk of the incident anemia (per 1 μg/mL increase, hazard ratio, 1.02; 95% confidence interval 1.01–1.03; P = 0.02).

Conclusions : High serum adiponectin level is independently associated with low haemoglobin level and predicts the newly development of anemia in CKD patients. These findings unveil the potential role of adiponectin on CKD-related anemia.

Keywords : adiponectin, anemia, chronic kidney disease