Abstract

Background: Anemia is a frequent complication in patients with chronic kidney disease (CKD), with the incidence rising in stages 3–5. Iron deficiency and defective erythropoiesis are the major causes. Still, the role of iron status and the stimulating capability of ESAs on the progression of CKD have hardly been evaluated.

Objective: To assess the effect of iron deficiency and ESA therapy with respect to the correction of anemia and preservation of kidney function in patients with CKD stages 3–5.

Methods: A follow-up observational study was carried out in 120 CKD patients at nephrology department in a tertiary institution, from January 2023 to December 2024. The patients were classified into three groups: Group 1 and Group 3 considered iron-deficient, with no ESA and ESA therapy, respectively, while Group 2 was non–iron-deficient with no ESA. The parameters tested were hemoglobin levels, serum ferritin, transferrin saturation (TSAT), and estimated glomerular filtration rate (eGFR) at baseline and at 6 months after treatment. The ESA treatment given consisted of epoetin alfa or darbepoetin alfa, with iron supplementation given according to iron-deficiency status.

Results: Baseline hemoglobin levels were significantly lower in Group 1 (9.5 ± 1.2 g/dL), and these subjects were associated with a faster decline of eGFR by value per year (annual decline in eGFR: 3.5 ± 2.3 mL/min/1.73 m^2) compared to Groups 2 and 3 ($p < 0.01$). The ESA-treated group (Group 3) exhibited relatively the greatest improvement in hemoglobin level (to 12.3 ± 1.5 g/dL) and the slowest decline in kidney function (1.7 ± 1.2 mL/min/1.73 m^2). Iron supplementation produced greater changes in ferritin and TSAT.

Conclusion: Iron deficiency is a paramount modifiable driver of anemia and CKD progression. ESA treatment improves anemia and retards renal deterioration, especially when coupled with iron supplementation. Early detection and correction of anemia might merit interplay in pursuit of optimized CKD outcomes.