Early Hemoglobin Levels after Kidney Transplantation Predict Clinical Outcomes: A Nationwide Cohort Study

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Introduction: Anemia is associated with significant adverse outcomes in kidney transplant recipients (KTRs). However, the association between early hemoglobin levels after kidney transplantation (KT) and long-term clinical outcomes is uncertain. We investigated the clinical impact of hemoglobin levels at 6 months after KT on posttransplant outcomes.

Methods: We analyzed 7,501 KTRs from a nationwide cohort data, the Korean Organ Transplant Registry (KOTRY). KTRs were divided into 6 hemoglobin categories: <10, 10 to <11, 11 to <12, 12 to <13, 13 to <14, >=14 g/dL. The multivariable Cox regression model was used to investigate the effect of hemoglobin levels on all-cause mortality, cardiovascular events, and graft loss.

Results: The mean age was 49.6 ± 11.6 and male ratio was 60.4%. The prevalence of diabetes and cardiovascular diseases were higher and that of hypertension was lower in hemoglobin levels <10 g/dL. There were 122 patient deaths (1.4%), 568 cardiovascular events (6.7%), and 200 graft losses (2.4%) during the study period; the incidences of each outcome were the highest in hemoglobin levels <10 g/dL (all P <0.05). Hemoglobin levels <10 g/dL was associated with increased risk of all-cause mortality, cardiovascular events, and graft loss compared with hemoglobin of 12 to <13 g/dL as reference (adjusted hazard ratio [aHR] 4.82, 95% confidence interval [CI] 2.69-8.65, P <0.001; aHR 1.76, 95% CI 1.06-2.94, P =0.030; aHR 9.79, 95% CI 5.54-17.3, P <0.001, respectively). Hemoglobin levels >=14 g/dL were independent factors for better mortality (aHR 0.32, 95% CI 0.14-0.73, P =0.007).

Conclusion: The post-transplantation anemia below 10 g/dL was an independent predictor of all-cause mortality, cardiovascular event, and graft loss in KTRs. However, hemoglobin levels greater than 14 g/dL showed a protective effect on patient survival. Appropriate monitoring and correction of hemoglobin should be a target of management in the early period after KT.