The Role of Osteocalcin, TRAP, and TNF-α in Predicting Anemia Severity in Patients with Chronic Kidney Disease

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ABSTRACT

Anemia is a major and challenging complication in patients with chronic kidney disease, especially those undergoing maintenance hemodialysis. Bone-derived and inflammatory markers such as osteocalcin, TRAP, and TNF-α may contribute to anemia severity through multiple pathways. This study aimed to determine the predictive value of these biomarkers in assessing anemia severity among hemodialysis patients at Hamida Al-Masfah Dialysis Center, Al-Imamain Al-Kadhimain Teaching Hospital, Baghdad. A cross-sectional study was conducted over six months, from November 1, 2023 to April 20, 2024, involving 100 adult patients. Patients were classified according to KDIGO guidelines into mild, moderate, and severe anemia groups. Results revealed significantly higher mean levels of osteocalcin, TRAP, and TNF-α in patients with mild anemia compared to those with moderate and severe forms (p = 0.019, 0.008, and <0.001, respectively). ROC analysis showed that TNF-α had the highest diagnostic accuracy (AUC = 0.731), followed by osteocalcin and TRAP. These findings suggest that elevated levels of osteocalcin, TRAP, and TNF-α are associated with anemia and may serve as useful biomarkers in predicting anemia severity in CKD patients undergoing hemodialysis.

Keywords: Chronic kidney disease, Anemia, Hemodialysis, Osteocalcin, TRAP, TNF-α, Biomarkers

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