

Inflammatory status in patients with different stages of chronic kidney disease

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Cardiovascular diseases and malnutrition are the major causes for mortality and morbidity in patients with chronic kidney disease (CKD). It is evident that inflammation is a contributor to morbidity and mortality in end stage CKD. The aim of this study was to evaluate some inflammatory markers in CKD patients. A cross sectional study was carried out in 110 patients divided into 5 groups according to the classification of the National Kidney Foundation based on glomerular filtration rate (GFR)⁽¹⁾. CKD stage 1 ($n = 20$ with GFR > 89 ml/min), CKD stage 2 ($n = 20$ with GFR 60–89 ml/min), CKD stage 3 ($n = 20$ with GFR 30–59 ml/min), CKD stage 4 ($n = 15$ with GFR < 30 ml/min) and Hemodialysis (HD; $n = 35$).

Serum Tumor Necrosis Factor (TNF- α), interleukin-1 β (IL-1 β), interleukin-6 (IL-6) and C-reactive protein (CRP) were analyzed by enzymeimmunoassay (EIA) (Cayman Chemical Kits), immunoassay methods were used for transferrin, ferritin (ADVIA Centaur) and fibrinogen analysis (ACL 200).

Results showed that TNF- α and fibrinogen values were more elevated in CKD stage 2, CKD stage 3, CKD stage 4 and HD than CKD stage 1 ($p < 0.001$). IL-1 β , CRP and ferritin concentrations were enhanced in CKD stage 3, CKD stage 4 and HD, respectively compared to CKD stage 1 and CKD stage 2 ($p < 0.001$). IL-6 amounts were enhanced and transferrin decreased in CKD stage 4 and HD, respectively compared to others groups ($p < 0.001$).

CHD is associated with elevated inflammation markers, providing evidence of enhanced inflammatory reaction existing already at CKD primary stages. This situation is aggravated by the progression disease and hemodialysis procedure. These patients are high risk of cardiovascular diseases and malnutrition. The practical consequence would be intensified lifestyle modification treatments.

1. Levey AS, Coresh J, Balk E *et al.* (2003) *Ann Intern Med* **139**, 137–147.