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Quantification of serum hepcidin in kidney diseases and oxidative stress

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Chronic kidney disease (CKD) is characterized by complex changes in cellular metabolism, leading to oxidative stress (OS), increased production of oxidative radicals (OR), which can play a key role in a number of clinical complications of this pathology. Trace elements selenium (Se), copper (Cu) and zinc (Zn) play a major role in the antioxidant defense system. The antioxidant enzymes are superoxide dismutase (SOD), catalases (CAT) and glutathione peroxidases (GSH-Px). We evaluated serum hepcidin, plasma selenium concentrations and the superoxide dismutase activity in 66 CKD patients with CKD, including on hemodialysis. Patients were monitored at University Hospital "Aleksandrovska" Clinic of Nephrology and Clinic of Dialysis Treatment. The results were compared with a matched by sex and age control group. Serum hepcidin and SOD activity were determined by ELISA method. Plasma selenium concentration was examined with the help of AAS (Perkin-Elmer). All participants had determined CBC and biochemical parameters (on automatic analyzers by Siemens Healthcare). The serum iron and TIBC levels were determined by Ferrozine method. For statistical analysis of the results we used Student's paired t-test and Pearson's correlation. We found a statistically significant higher serum hepcidin levels in CKD patients, including on dialysis (397.4 μg/L ± 59.9 μg/L) compared to the control group (19.9 μg/L ± 2.6 μg/L; P<0.001). Plasma selenium levels and SOD activity were decreased in patients with CKD, including on dialysis (351.1 nmol/L ± 49.3 nmol/L; 38.4 μg/mL ± 7.1 μg/mL) compared to the control group (915.4 nmol/L ± 65.7 nmol/L; 125.7 μg/mL ± 11.5 μg/mL; P<0.001). The presence of anemic syndrome and oxidative stress are indisputable pathological conditions accompanying chronic kidney diseases. A significant percentage of patients on dialysis are with abnormal levels of certain important trace elements - Zn, Se, Cu, and magnesium and one recently discovered regulator of iron metabolism - hepcidin, and between all of the following conditions are found interconnections and influences.

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