

Determination of Oxidative Status in EDTA Plasma of Hemodialysis Patients by PerOx Assay

Marija Atanasova¹, Tatjana Ruskovska¹, Gordana Kamceva¹, Zorica Zajkova², Aneta Taskova²

¹Faculty of Medical Sciences, University "Goce Delcev" - Stip, R. Macedonia

²Center for Hemodialysis, Stip, R. Macedonia

Patients with end stage renal disease undergoing regular hemodialysis very often suffer from oxidative stress, which is defined as a state where the production of reactive oxygen species exceeds the capacity of the antioxidant defense systems in the cells and tissues. It has been observed that the free radical induced lipid peroxidation can further lead to a significant tissue damage, which plays role in the pathogenesis of various co-morbidities in the hemodialysis patients.

The aim of this study was to determine the plasma levels of total hydroperoxides in hemodialysis patients before the single hemodialysis session (N=13) in comparison with healthy persons (N=38), using an in-house PerOx assay, as an indication and quantification of the plasma oxidative status/oxidative stress. The determination of plasma hydroperoxides was performed by their reaction with horseradish peroxidase, followed by conversion of tetramethylbenzidine (TMB) into a colored product. Commercial standards with known concentrations of H₂O₂ in plasma matrix were used for calibration of the assay.

The results from the PerOx assay have shown that hemodialysis patients have significantly higher concentrations of plasma hydroperoxides (287±84 CARR U) than healthy subjects (238±65 CARR U) p<0.05 (one CARR U corresponds to 0.08 mg/100mL H₂O₂). These results indicate that the PerOx assay reflects an increased oxidative stress which is related to the end stage renal disease and chronic hemodialysis.

Further analyses are needed to establish the value of this assay with regards of the effects of the single hemodialysis session, the possible antioxidant supplementation and the comorbidities in the hemodialysis patients.

Key words: Oxidative status, Hemodialysis patients, PerOx assay