ANTIOXIDANT ENZYME ACTIVITY IN RENAL ISCHEMIA

Arsenova Mukhabat Abdumominovna
Iriskulov Bakhtiyor Uktamovich
Mukhamedova Nurkhan Khalilovna
Tashkent State Medical University,
Kimyo International University in Tashkent
Uzbekistan, Tashkent
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ABSTRACT

Renal ischemia is accompanied by severe metabolic disturbances, one of the key components of which is the development of oxidative stress. Oxygen deficiency and impaired microcirculation lead to increased generation of reactive oxygen species, which damages cell membranes, proteins, and DNA. The body's antioxidant system plays a leading role in protecting tissues from free radical oxidation..

Introduction. The main enzymatic components of antioxidant defense are superoxide dismutase, catalase, and glutathione peroxidase. In ischemic kidney injury, an imbalance occurs between the intensity of lipid peroxidation and the activity of antioxidant enzymes, which contributes to the progression of ischemic damage to the nephrons.

This study aims to investigate the activity of antioxidant enzymes in experimental renal ischemia. The data obtained allow us to clarify the pathogenetic mechanisms of oxidative stress and substantiate the need for antioxidant interventions in the prevention of ischemic complications.

The aim of the study was to investigate changes in antioxidant enzyme activity during renal ischemia.

Research objectives

To determine the activity of superoxide dismutase in the tissue of an ischemic kidney. To study the level of catalase as an indicator of antioxidant protection. To assess the activity of glutathione peroxidase in ischemic kidney injury.

Research methods. Experimental model of unilateral renal ischemia (partial occlusion of the renal artery).

Biochemical determination of the activity of antioxidant enzymes: superoxide dismutase (SOD), catalase, glutathione peroxidase.

Assessment of the degree of oxidative stress by the level of lipid peroxidation products (MDA).

Statistical processing of results with determination of the reliability of differences ($p< 0.05$).

Study results. The study found that renal ischemia is accompanied by a decrease in the activity of key antioxidant enzymes. In the experimental group, a significant decrease in the activity of superoxide dismutase and catalase was observed, indicating depletion of enzymatic

antioxidant defenses. In glutathione peroxidase activity was simultaneously observed, indicating impaired utilization of peroxide compounds. These changes were accompanied by an increase in the level of lipid peroxidation products, confirming the development of severe oxidative stress in ischemic renal tissue injury.

Thus, a decrease in the activity of antioxidant enzymes is an important pathogenetic factor in the progression of ischemic kidney damage.

Conclusions. Renal ischemia is accompanied by the development of oxidative stress and a decrease in antioxidant system activity. Superoxide dismutase and catalase activity significantly decrease in ischemic kidney injury, indicating depletion of antioxidant defenses.

glutathione peroxidase activity contributes to the accumulation of toxic peroxide products. Impaired enzymatic antioxidant defenses play a significant role in the pathogenesis of ischemic nephron injury. The findings support the use of antioxidant therapy for ischemic kidney injury.

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