

Study of Oxidative Processes in Blood Serum in Patients with Arterial Hypertension

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Abstract : Hypertension (HD) is the most common cardiovascular pathology that causes disability and mortality in the working population. Most often, heart failure (HF), which is based on myocardial remodeling, leads to death in hypertension. Recently, endothelial dysfunction (EDF) or a violation of the functional state of the vascular endothelium has been assigned a significant role in the structural changes in the myocardium and the occurrence of heart failure in patients with hypertension. It has now been established that tissues affected by inflammation form increased amounts of superoxide radical and NO, which play a significant role in the development and pathogenesis of various pathologies. They mediate inflammation, modify proteins and damage nucleic acids. The aim of this work was to study the processes of oxidative modification of proteins (OMP) and the production of nitric oxide in hypertension. In the experimental work, the blood of 30 donors and 33 patients with hypertension was used. For the quantitative determination of OMP products, the based on the reaction of the interaction of oxidized amino acid residues of proteins and 2,4-dinitrophenylhydrazine (DNPH) with the formation of 2,4-dinitrophenylhydrazones, the amount of which was determined spectrophotometrically. The optical density of the formed carbonyl derivatives of dinitrophenylhydrazones was recorded at different wavelengths: 356 nm - aliphatic ketone dinitrophenylhydrazones (KDNPH) of neutral character; 370 nm - aliphatic aldehyde dinitrophenylhydrazones (ADNPH) of neutral character; 430 nm - aliphatic KDNFG of the main character; 530 nm - basic aliphatic ADNPH. Nitric oxide was determined by photometry using Grace's solution. Adsorption was measured on a Thermo Scientific Evolution 201 SF at a wavelength of 546 nm. Thus, the results of the studies showed that in patients with arterial hypertension, an increased level of nitric oxide in the blood serum is observed, and there is also a tendency to an increase in the intensity of oxidative modification of proteins at a wavelength of 270 nm and 363 nm, which indicates a statistically significant increase in aliphatic aldehyde and ketone dinitrophenylhydrazones. The increase in the intensity of oxidative modification of blood plasma proteins in the studied patients, revealed by us, actually reflects the general direction of free radical processes and, in particular, the oxidation of proteins throughout the body. A decrease in the activity of the antioxidant system also leads to a violation of protein metabolism. The most important consequence of the oxidative modification of proteins is the inactivation of enzymes.

Keywords : hypertension (HD), oxidative modification of proteins (OMP), nitric oxide (NO), oxidative stress

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