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The Importance of a Group of Reliable Markers in Determining the Relationship between Uromodulin and Oxidative Stress

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Annotation: To determine the relationship between uromodulin and the presence of oxidative stress, it is necessary to assess the level of malondialdehyde in the blood serum, which is considered a reliable marker of the latter condition. It is known that oxidative stress occurs as a result of an imbalance between the oxidation and antioxidant systems. In this case, the process proceeds with a predominance of the oxidation process, resulting in cell damage.

Keywords: Uromodulin, oxidative stress, SBK (chronic kidney disease), Superoxide dismutase.

Over the past two decades, the physiology, structure, function, regulation, genomics, and potential clinical applications of uromodulin have been progressively studied, revealing its previously unknown properties. Extensive research has deepened our understanding of the role of uromodulin in various disease states.

Although much attention has been paid to its importance as a biomarker of kidney disease, in recent years, numerous clinical and Mendelian randomization studies have provided increasing evidence linking uromodulin to cardiovascular disease and mortality. This relationship is understandable because of the known relationship between SBK and LUQTK, and the studied role of uromodulin in salt-sensitive hypertension.

Approximately 90% of uromodulin production is synthesized by the cells of the thick ascending limb, and the remaining 10% by the epithelial cells of the initial part of the distal convoluted tubule. Its normal daily excretion through urine is 50-150 mg.

Studies by Steubl and co-authors have shown that high levels of uromodulin in serum and urine are associated not only with a reduced risk of end-stage renal disease in the elderly, but also with

a reduced risk of cardiovascular disease, such as myocardial infarction, stroke, and death from coronary artery disease. Serum uromodulin is a reliable biomarker for assessing renal function and has unique advantages in detecting early stages of SCD. Unlike conventional renal retention markers, serum uromodulin exhibits a reverse pattern, decreasing in concentration as renal function declines. Uromodulin has been reported to decrease in blood and urine before the estimated glomerular filtration rate declines in the development of chronic kidney disease, and thus has been shown to be a predictor of this severe complication. Polymorphism of its genes has been studied among people living in countries located in a number of different regions. They showed that gene polymorphism changes depending on age, nationality, race. However, changes in the blood levels of this protein have not been studied in patients with chronic kidney disease caused by chronic heart failure, that is, cardiorenal syndrome, and in individuals of Uzbek ethnicity. The superoxide dismutase family exerts an antioxidant effect on oxidative stress processes and is one of the first group of stress-modulating enzymes. Superoxide dismutase outside the active cells of the cardiovascular system is its dominant isoform (about 70%). A review of the literature confirms that the uromodulin protein is important not only in a number of kidney diseases, but also in predicting SCD and cardiovascular events.

The relationship between serum protein levels and oxidative stress, which is considered one of the main causes of cardiovascular disease, has been proven in recent studies.

However, there is no information in the literature on the role of Tamm-Horsfall protein in the early detection of SCD developing on the basis of SUE, its degree of correlation with malondialdehyde, a reliable marker of oxidative stress, and its antagonist superoxide dismutase. In addition, in a small number of observations, information is provided about the importance of uromodulin gene polymorphism in the occurrence of changes in the kidney.

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