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Toxic Nephropathy

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Annotation: The article is devoted to the condition of the kidneys in poisoning. It was revealed that acute exogenous poisoning with systemic poisons, drugs with nephrotoxic potential, natural nephrotoxins, substances causing myolysis can cause the development of the renal phenotype of diffuse bilateral acute kidney injury - a private and most typical variant of toxic nephropathy, and also be the cause of tubulointerstitial nephritis with an outcome in nephrofibrosis or nephrogenic systemic fibrosis. Thus, the experimental substantiation of new approaches to the diagnosis of nephropathies of toxic genesis and the expansion of the capabilities of the methods used is a timely and relevant study of extremely important socio-economic significance.

Keywords: kidneys, exogenous agents, impact, pathological changes.

Introduction. According to WHO data, mortality from unintentional poisonings in Asian countries exceeds the global average by 40%, and from intentional ones - by 61% (World Health Statistics, 2024). According to the Department of Monitoring, Analysis and Strategic Development of Healthcare of the Ministry of Healthcare of the Russian Federation and the Central Research Institute for Healthcare Organization and Informatization, the number of poisonings with drugs, medical and biological substances, as well as non-medical substances per 100 thousand people was 64.4 69.0 in 2018 (101407 abs.). Acute exogenous poisoning with systemic toxins, drugs with nephrotoxic potential, natural nephrotoxins, substances that cause myolysis can cause the development of the renal phenotype of diffuse bilateral acute kidney injury - a particular and most typical variant of toxic nephropathy, and also be the cause of tubulointerstitial nephritis resulting in nephrofibrosis or nephrogenic systemic fibrosis (Alyabyev F.V., et al., 2019; Smirnov A.V., 2016; Cleto-Yamane T.L., et al., 2019) [2,6,10,12].

The term "toxic nephropathy" refers to the development of kidney damage as a result of chemical injury (poisoning) or drug therapy. Kidney-specific risk factors for the development of toxic nephropathy are: high renal blood flow, relatively hypoxic environment, increased concentration of drugs/toxins in the renal medulla and interstitium, biotransformation of drugs/toxins with the formation of reactive oxygen species, high rate of tubular cell metabolism in the loop of Henle, protein uptake by apical tubular membranes by receptor-mediated endocytosis, basolateral tubular transport of xenobiotics through organic cation and anion transporters (Luzhnikov E.A., 2014; Amin R., et al., 2021; Perazella M., 2019:) [8,11,15].

The etiological factors are: toxic damage to the glomeruli and epithelium of the renal tubules by direct nephrotoxins, intratubular obstruction by pathological cylinders and crystals, necrotic papillitis, drug-induced and idiopathic acute tubulointerstitial nephritis, rapidly progressive glomerulonephritis, microangiopathies, and nephrotoxins account for 80–90% of renal etiology (Vdovina N.V., 2024) [5].

Nephrotoxicity can vary from minimal to significant necrosis, from changes in individual tubular functions to significant renal failure and electrolyte imbalance. Pathomorphological mechanisms of action are very diverse, depend on the type of toxicant and include direct damage to the epithelium of the renal tubules (nephrotheliocytes), impaired transport of anions and cations, protein reabsorption, inflammatory response, activation of oxidative stress and apoptosis, various modalities of regulated

necrosis, intratubular obstruction by crystals (Averjanov S.N., et al., 2018; Kuzmin O.B., et al., 2017; Dettmeyer R.B., 2018) [1,7,13].

The loss of detoxifying functions of the kidneys has a significant impact on the cardiovascular, respiratory and hepatobiliary systems, causing general homeostasis disorders (Sivak K.V., 2019; Smirnov A.V., 2016) [9,10]. Toxic damage is a life-threatening condition, causes a high risk of death (30-40%) and requires immediate therapy, including: gastrointestinal sorption, in 50% of cases hemodialysis, peritoneal dialysis (Belonogov I., et al., 2014; Berchenko M.A., 2014; UK Renal Association, 2017) [3,4], albumin dialysis and plasma filtration with adsorption and dialysis, as well as measures aimed at maintaining effective renal blood supply and limiting fibrosis (Eddy A.A., 2020) [14].

Conclusion. Accordingly, the experimental substantiation of new approaches to the diagnosis of toxic nephropathy and the expansion of the capabilities of the methods used is a timely and relevant study that has extremely important socio-economic significance.

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