

CONDITION OF THE CARDIOVASCULAR SYSTEM IN CHILDREN WITH CHRONIC GLOMERULONEPHRITIS ASSOCIATED WITH HYPERURICEMIA AND DISORDERS OF URIC ACID METABOLISM

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Relevance. Both nephrologists and cardiologists currently recognize that most of the known risk factors for cardiovascular diseases—such as arterial hypertension, obesity, diabetes mellitus, dyslipoproteinemia, microalbuminuria, and others—are simultaneously risk factors for the development of chronic kidney disease (CKD). The majority of prospective studies have demonstrated a positive association between serum uric acid levels and cardiovascular mortality, as well as overall mortality.

Aim of the study. To study and assess the state of the cardiovascular system in children with chronic glomerulonephritis (CGN) associated with hyperuricemia and disorders of uric acid metabolism.

Materials and Methods. The study was conducted from 2024 to 2025 in 48 children aged 6 to 18 years who were hospitalized in the nephrology department of the Khorezm Regional Multidisciplinary Children's Medical Center with a diagnosis of chronic glomerulonephritis (CGN). The study group consisted of 20 girls and 28 boys aged from 6 to 18 years. General clinical examination included genealogical (family history) analysis, obstetric history, assessment of living conditions, evaluation of past and concomitant diseases, as well as data from complete blood analysis, urinalysis, stool analysis, and biochemical blood parameters: urea, creatinine clearance calculated by the Schwartz formula, residual nitrogen, glomerular filtration rate (GFR), total protein, cholesterol, uric acid, uric acid clearance, C-reactive protein, and serum calcium. To assess the clinical and functional state of the heart, instrumental investigations were performed, including chest X-ray, electrocardiography (ECG) and phonocardiography (PCG) recorded using a six-channel electrocardiograph "CARDIOFAX ECG882-OK", and echocardiography using the "SIM-5000" device. According to indications, additional examinations were carried out, such as ultrasound examination, excretory urography, radioisotope studies, and consultations with specialized specialists (neurologist, otorhinolaryngologist), among others.

Results. Analysis of anamnesis data revealed that in the majority of children, the triggering or provoking factors for the development of CGN were inflammatory diseases (34.7%), while less frequently angina or exacerbation of chronic tonsillitis (24.6%), which occurred 2–3 weeks prior to the clinical manifestation of the disease. In

children with purine metabolism disorders, a large number of external stigmas of dysembryogenesis (up to six) and anomalies in the structure of internal organs were identified. These included “minor” cardiac malformations (valve prolapse, additional chordae), as well as structural anomalies of the kidneys and gallbladder. In 90% of cases, chronic pathology of the gastrointestinal tract was detected. Signs of myocardial metabolic disorders were observed almost as frequently, occurring in 80–82% of cases. More than half of these children were diagnosed with arterial hypotension, while one-quarter of patients showed a tendency toward arterial hypertension. The most common pathological ECG findings included left ventricular myocardial hypertrophy (71.5%), right ventricular hypertrophy (47.5%), prolonged QT interval (72.1%), decreased voltage of ECG waves (45.7%), incomplete right bundle branch block (24.6%), intraventricular conduction delay (21.4%), and extrasystoles (19.5%). Disorders of repolarization were manifested by flattening (58.4%) and inversion (48.3%) of the T wave. Analysis of echocardiographic parameters in children with different forms of CGN demonstrated that left ventricular wall thickness, as well as left ventricular myocardial mass (LVMM) and its index (LVMMI), significantly exceeded normal values in all patient groups. Comparison of patients with various forms of CGN revealed that all parameters, except posterior left ventricular wall thickness and left atrial size, differed significantly between groups. When determining the type of left ventricular hypertrophy (LVH), it was found that almost all patients with LVH (95.5%) exhibited altered left ventricular geometry (spherical remodeling), while only 4.5% retained normal geometry.

Conclusions. Our studies have established that elevated uric acid levels lead to ventricular hypertrophy, autonomic (vegetative) vascular dystonia, cardiac rhythm disturbances, arterial hypertension, and other cardiovascular pathologies in children with chronic glomerulonephritis. The identified changes in the functional state of the heart dictate the need for further research aimed at continuing the study of the mechanisms underlying pathological processes in children with CGN, as well as for the implementation of appropriate corrective and rehabilitation measures.

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