

techniques, the study identified the genomic structure of SARS-CoV-2 and its similarities to other coronaviruses. The study also identified the key proteins involved in the virus's replication and pathogenesis. Furthermore, the study identified potential targets for antiviral therapies and vaccines. The results of this study provide important insights into the virology of SARS-CoV-2 and will be useful for the development of effective treatments and vaccines. This study also provides important insights into the virology of SARS-CoV-2 and will be useful for the further development of ideal treatments and vaccines.

## **MORPHOLOGICAL CHANGES OF THE KIDNEYS AND LIVER IN PATIENTS WITH COVID-19**

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**Relevance.** In 2020 WHO announced that the COVID-19 pandemic had started. SARS-CoV-2 is RNA-positive virus which triggers respiratory diseases among people (particularly acute respiratory disease COVID-19) and can be contracted. Nowadays the most lungs tissue tropism of virus is morphologically discovered, whilst the influence on the other organs is not so deeply researched. Therefore the purpose of our scientific work is to study the structural changes of liver and kidneys. Aim of the study. To study at the morphological level the changes that occur in the kidneys and liver of people who died from COVID-19.

**Material and methods.** A pathomorphological study of 20 corpses with a diagnosis of COVID-19 of different sexes, aged 52-68 years for 2020-2021. Sectional material (kidneys and liver) was collected

for further macro- and microscopic examination. The study is in line with the moral and ethical principles of the Declaration of Helsinki.

**Results.** Macroscopically, the kidneys of those who died from COVID-19 are enlarged, swollen, their fibrous capsule is tense, easily removed. Microscopic examination of the kidneys shows that the glomerular apparatus of the kidneys is characterized by edema and fibrinoid necrosis of the mesangial matrix, focal hemorrhages between the loops of the capillary net, plethora of capillaries, expansion of the Bowman capsule. Eosinophilic masses are in the lumen of the tubules. Focal necrosis of the tubular epithelium are with destruction of the basement membranes (tubulorexis), eosinophilic masses and hemorrhages are in the lumen of the tubules, which is characteristic by necrotic nephrosis. Interstitium is with severe edema. Peritubular vessels are sharply full-blooded, the expressed erythrodiapedesis and hemorrhages are in a stroma.

Macroscopic examination of the liver of people who died from COVID-19 showed that it was enlarged, swollen, greenish-yellow, with punctate hemorrhages on the surface and incision. Microscopic examination of the liver showed that SARS-COV-2 caused significant morphological changes in organ structure and hemodynamics. Hepatocytes are in a state of large-drop fatty dystrophy, their nuclei are in a state of swelling. Centrolobular focal necrosis of hepatocytes was detected. There are foci of lymphoplasmacytic infiltration and sclerosis perivascularly and in the portal tract. Most sinusoid capillaries are dilated, full-blooded with the phenomenon of parietal erythrocyte stasis. Bile capillaries are significantly dilated, full of bile. There is also severe perivascular edema. Perisinusoid spaces are expanded.

**Conclusions.** Thus, COVID-19 has a pronounced adverse effect on the structure and hemodynamics of human kidneys and liver at the macroscopic and microscopic levels. Leading pathological changes of kidneys are necrotic nephrosis, of liver are fatty degeneration and stasis in the bile capillaries. These pathomorphological changes confirm the systemic nature of lesions in patients with severe COVID-19 associated with pathogenetic links such as cytokine

storm, hypoxia, hypovolemia, coagulation disorders, effects of drug therapy and direct cytolytic action of the virus on target cells.

## **INFLUENCE OF METHOTREXATE DOSING REGIMEN ON THE STATE OF THE CARDIOVASCULAR SYSTEM IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS (JIA)**

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**Introduction.** It is known that the main goal of treatment of children with JIA is to alleviate the symptoms of arthritis and systemic manifestations of the disease, to achieve a stage of drug-free remission, to prevent disability of patients. But some drugs used in the treatment of systemic connective tissue diseases can have potentially adverse effects on the vascular wall, blood clotting and blood pressure, and thus increase the risk of cardiovascular complications. Also, the main basic drug methotrexate (MTX) can lead to fibrosis.

**The aim of the study.** To analyze the frequency of changes in the cardiovascular system in children with JIA, taking into account the mode of administration of MTX.

**Materials and methods.** The results of dynamic observation of 121 children aged 3 to 18 years (mean age was  $11.00 \pm 0.33$ ) years with JIA (poly-, oligoarticular and uveitis-associated variants), the average duration of which was  $58.52 \pm 2.27$  months, were analyzed. Among patients, females predominated - 73.55% ( $p < 0.001$ ). The study of the functional state of the cardiovascular system (CVS) included the determination of heart rate (HR), blood pressure (BP), electrocardiography and ultrasound of the heart. The main regimen of MTX was from 10 to 15 mg per week.