



Pathological Changes in the Urinary System of Patients With Covid-19 Disease

¹Khaytboyev J.A.,
²Rakhmanova S.S.

Received 22nd Mar 2023,
Accepted 23rd Apr 2023,
Online 06th May 2023

^{1,2} Urganch Branch of Tashkent
Medical Academy

Abstract: Although Covid-19 primarily affects the lungs, but in some patients, the infection can also spread to the kidneys. Some of the patients with coronavirus had kidney problems. In this study, pathological changes in the urinary system of patients with covid-19 were described. Clinical and laboratory changes observed in the urinary system of patients, the causes of functional disorders of the kidneys and their safe treatment are listed.

Key words: covid-19, chronic pyelonephritis, interstitial nephritis, leukocyturia, chronic renal failure, transient creatininemia.

Research to date shows that Covid-19 has a wide range of symptoms, and for those with severe and severe disease, the long-term consequences can be life-threatening: from lung tissue blockage and kidney failure to inflammation of the heart muscle, arrhythmias, liver damage, cognitive impairment, disorder, psychosis and hakoza with sudden mood swings. At first it seemed to be a common respiratory disease like SARS or bird flu, but later it became clear that the coronavirus (its official name is SARS-CoV-2) infects the lungs, brain, nasopharynx, eyes, heart, blood vessels, liver, kidneys and intestines, i.e. it turned out that it can affect literally all vital organs.

Although Covid-19 primarily affects the lungs, the infection has spread to the kidneys in some patients. According to the results of a sample study conducted in China, 27 percent of the patients who came to Wuhan hospitals with coronavirus had kidney problems [3].

Another study found 59 percent of urine from hospitalized patients in Hubei and Sichuan provinces showed protein that confirmed infection, and 44 percent showed blood that indicated severe kidney damage. In addition, the risk of death in patients with acute renal failure was 5 times higher than in normal patients infected with coronavirus [3].

Pyelonephritis is a nonspecific infectious inflammatory disease of the interstitial tissue of the renal parenchyma and the wall of the calyx system [7]. Chronic pyelonephritis is a common disease among the population. Its prevalence is 6-30% of the population (according to autopsy data), and it is half of all nephrological diseases. The incidence is 18 per 1000 population in one year [2]. Asymptomatic bacteriuria is 0.5% of men, 2.5% of girls, 7.5% of women, 5.5% of pregnant women. It occurs 2-5 times more often in women than in men. Chronic renal failure (SBE) develops in 10-20% of patients with chronic pyelonephritis, and dangerous arterial hypertension (AG) develops in 10%. From year to year, the incidence rates around the world are increasing, and the consequences are getting worse. Complete recovery from the disease can be observed only if it is diagnosed early, rational antibacterial therapy is carried out, and there are no foci of chronic infection. Therefore, doctors should be well aware of the clinical syndromes of chronic pyelonephritis, use additional diagnostic methods, be able to correctly assess the results of the analysis, and certainly provide rational therapy [5].

Chronic pyelonephritis is asymptomatic in most cases and is sometimes detected in general urinalysis and ultrasound examinations. Severe pyelonephritis can be observed in the presence of kidney stones, immune disorders, anatomical structural defects, and diabetes mellitus [3].

Interstitial nephritis is an inflammation of the interstitial tissue and tubules of the kidney, especially immune inflammatory processes prevail, and is always accompanied by kidney filtration and concentration disorders. Interstitial nephritis occurs in acute and chronic forms. Acute interstitial nephritis can be caused by drugs, viruses, bacteria, and immune disorders. The acute onset of acute interstitial disease is characterized by fever, back pain, hematuria, and acute renal failure [1].

Acute drug-induced interstitial nephritis is often associated with the use of antibiotics (methicillin, ampicillin, oxacillin, carbenicillin, cephalosporins, rifampicin, aminoglycosides), less often - sulfonamides, diuretics, allopurinol. In the elderly, the disease may develop after the use of non-steroidal anti-inflammatory drugs [9]. The first clinical sign of acute drug-induced interstitial nephritis is often a repeated rise in body temperature, sometimes accompanied by a rash after the use of antibiotics to treat infected patients. The diagnosis can be based on the presence of protein and erythrocytes in the urine.

Acute viral interstitial nephritis is often observed in hemorrhagic fever with renal syndrome. The clinical presentation of bacterial interstitial nephritis corresponds to acute pyelonephritis. Parasitic interstitial nephritis is primarily noted in leptospirosis. Immune acute interstitial nephritis is observed in acute rejection of a transplanted organ, rarely in systemic lupus erythematosus.

Chronic tubulointerstitial nephritis is associated with bacterial infection, drugs, and immune disorders. Etiology is often unknown (idiopathic chronic interstitial nephritis). Among the drugs that lead to the development of chronic interstitial nephritis, the main place is occupied by painkillers - phenacetin, acetylsalicylic acid, analgin, less indomethacin. The most dangerous is the long-term use of combinations of analgesics [9].

In chronic interstitial nephritis, water-electrolyte disorders (acidosis, hyperkalemia) and renal concentration disorders develop relatively quickly. There will be complaints typical of chronic kidney failure. It is natural for patients with Covid-19 to have some pre-existing kidney disease, causing the disease to become more severe. Therefore, interstitial nephritis and kidney function disorders are more common in patients who previously suffered from chronic pyelonephritis. This, in turn, aggravates the course of the covid-19 disease. Due to the fact that nephritis is observed in patients suffering from coronavirus infection, the study of this disease is considered the need of the hour.

The purpose of the study

Studying the course of this disease in patients with chronic pyelonephritis, poor remission period, when infected with Covid-19. That is, it consists in determining the observed changes in the urinary system of patients.

Materials and methods

In the "Center for the Distribution and Sorting of Patients Suspected or Infected with Covid-19" located in the city of Urganch, Khorezm Region, examination of patients with confirmed SARS-CoV-2 infection and a history of chronic pyelonephritis by PCR (polymer chain reaction) method was carried out. "U-07.2 Sovid-19. 32 patients with "Middle Thief Pass" were selected and a special survey was conducted. Based on the questionnaire, it was found that 27 patients did not have clinical symptoms of chronic pyelonephritis in the last 6 months, 3 patients did, and 2 patients are currently having them. Our scientific examination was based on subjective and objective symptoms, dynamic laboratory tests (general blood analysis, general urinalysis, urine analysis according to Nechiporenko, urine bacteriological culture, blood biochemical examination) on the day of the patient's arrival at the hospital and on the 10th day of the disease.

Results and Discussions

Before treatment, the laboratory parameters were as follows: UQT:lei $5.7 \pm 0.4 \cdot 10^9$ units/ml, EChT 11.3 ± 1.2 mm/hour, UST:lei 3.8 ± 0.5 units/l, protein 0.4 ± 0.1 g/l. Nechiporenko: leu 3040 ± 214 units/ml, erythritol 1025 ± 102 units/ml, tsil 15.3 ± 1.1 units/ml. Blood biochemistry: total protein 61.8 ± 1.8 g/l, urea 8.9 ± 1.2 mmol/l, creatinine 92.4 ± 22.1 mmol/l. Pathological microorganisms were not detected in the bacteriological culture of urine.

By the 10th day of the disease, clinical and laboratory changes began to be observed in 12 out of 27 patients with chronic pyelonephritis. Laboratory parameters were as follows: UQT:leu $8.7 \pm 0.7 \cdot 10^9$ ta/ml, EChT 11.5 ± 1.3 mm/h, UST:leu 18.7 ± 0.9 ta/l, protein 1.5 ± 0.6 g/l. Nechiporenko: leu 12610 ± 533 ml, erythritol 1410 ± 183 ml, tsil 31.4 ± 1.3 ml. Blood biochemistry: total protein 59.5 ± 1.7 g/l, urea 11.6 ± 1.3 mmol/l, creatinine 168.3 ± 32.9 mmol/l. Pathological microorganisms were detected in the bacteriological culture of urine: Escherichia coli-33.0%, Enterobacter spp-25.0%, Staphylococcus hemaliticus-16.6%, Proteus vulgaris-8.3%, Staphylococcus epidermidis-8.3%, Staphylococcus fecalis-8.3%, Pseudomonas aeruginosa-8.3%.

Despite the standard therapeutic procedures against the disease of Covid-19, by the 3rd day of the disease, back pain, dysuric, and inflammatory symptoms began to be observed in patients. After that, patients were given uroseptics (nitroxolin). Subjective and objective symptoms characteristic of chronic pyelonephritis of the patients began to decrease again on the 3-5th day of administration of uroseptics, and laboratory indicators approached the norm.

Clinical and laboratory changes of interstitial nephritis began to be observed in 5 out of 27 isolated patients. Laboratory parameters were as follows: UQT:leu $7.7 \pm 0.7 \cdot 10^9$ ta/ml, EChT 14.5 ± 1.3 mm/hour, UST:leu 18.7 ± 0.9 ta/l, protein 2.5 ± 0.8 g/l. Nechiporenko: leu 9610 ± 423 ta/ml, erit 2410 ± 213 ta/ml, tsil 31.4 ± 1.3 ta/ml. Blood biochemistry: total protein 59.5 ± 1.7 g/l, urea 13.6 ± 1.3 mmol/l, creatinine

268.3±34.9mmol/l. Pathological microorganisms were not detected in the bacteriological culture of urine. These changes represent the symptoms of interstitial nephritis.

These patients were given microcirculation improver (emoxipin) and glucocorticosteroids (prednisolone) in addition to the standard therapeutic procedures for Covid-19. By the 4-5th day of administration of drugs, the clinical symptoms of interstitial nephritis decreased and the laboratory indicators improved.

Summary

44% of patients with Covid-19 had relapsed chronic pyelonephritis, and 18% had symptoms of interstitial nephritis. That is, by the 8-10th day of the disease, subjective and objective symptoms of chronic pyelonephritis appeared in the patients. Leukocyturia, bacteriuria reliably increased and transient renal failure was observed. Taking this into account, it is recommended to give uroseptics to patients with chronic pyelonephritis symptoms, to give kidney microcirculation improvers and glucocorticosteroids to patients with interstitial nephritis symptoms.

Books:

1. Batyushin M.M., Dmitriyeva O.V., Terentyev V.P., Davidenko K.S. Raschetnyye metody prognozirovaniya riska razvitiya analgeticheskogo interstitsialnogo porajeniya pochek // Ter. arh. 2008. № 6. S. 62–65.
2. Loran O.B. Neoslojnennyye infekcii mochevyvodyashchix putey: problema vybora racionalnoy antimikrobnoy terapii / O.B. Loran,
3. Muxin N.A. Diagnostika i lecheniye bolezney pochek / N.A. Muxin, I.Ye. Tareyeva, Ye.M. Shilov // Geotar-Med, 2008. – 384 s.
4. Natochin Yu.V., Vvedeniye v nefrologiyu / Yu.V. Natochin, N.A. Muxin. // Geotar-Med, 2007. – 160 s.
5. Roytberg G.Ye. Laboratornaya diagnostika zabolevaniy vnutrennix organov / G.Ye. Roytberg, A.V. Strutynskiy. // BINOM, 2006.-123 s.
6. Tareyeva I.Ye. Nefrologiya // Medisina, 2000. – 688 s.
7. Tumarenko A. Aktualnyye problemy nefrologii / A.Tumarenko, V. Skvorsov. // Feniks, 2008.–160 s.
8. Miller L.G. Treatment of uncomplicated urinary tract infections in an era of increasing antimicrobial resistance / Miller L.G., Tang A.W.// Mayo Clin Proc, 2004. -553 s.
9. Muriithi A.K., Leung N., Valeri A.M. et al. Biopsy-Proven Acute Interstitial Nephritis, 1993-2011: A Case Series // Am. J. Kidney Dis. 2014. Vol. 64, N 4. P. 558–566.