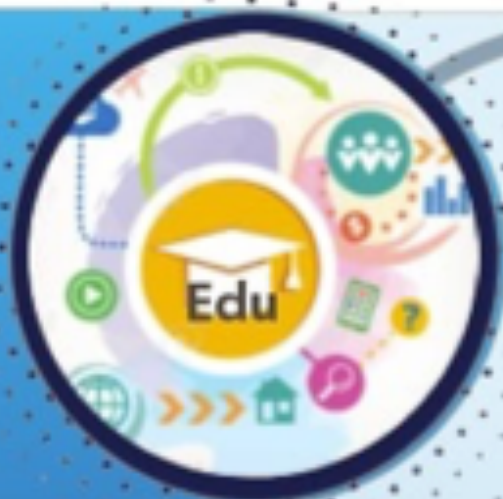


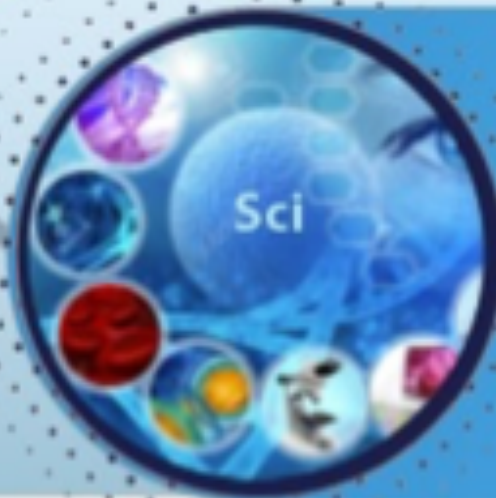


TASHKENT MEDICAL ACADEMY

100 TMA
ANNIVERSARY



Journal of Educational and Scientific Medicine



Issue 3 | 2024



OAK.UZ
Google Scholar

Science Education Commission of the Cabinet
Ministry of the Republic of Uzbekistan

ISSN: 2181-3175

Statistical information on the incidence of kidney injury in patients with COVID-19

B.Z. Khamdamov¹, I.A. Khursandov²

ABSTRACT

The SARS-CoV-2 coronavirus has turned into a life-threatening pandemic disease - COVID-19. It is known that the main manifestations of this disease are acute respiratory distress syndrome and diffuse alveolar damage. Although the respiratory system is the primary target of SARS-CoV-2, other organs in the body can be affected by the virus through the circulatory system. Initially, information about kidney damage was very scarce. Publications regarding kidney damage in SARS-CoV-2 at the early stage of the pandemic were not systemic in nature and were characterized by scattered clinical cases ranging from mild proteinuria to progressive acute renal failure. The first statistics on the incidence of kidney damage in patients who have had SARS-CoV-2 were presented by scientists at the Yale University School of Medicine based on a study of 1.6 clinical cases. According to their data, 24-57% of hospitalized patients have complications on the kidneys after coronavirus and during the course of the disease.

Keywords: SARS-CoV-2, kidney disease, statistics

Early reports of clinical cases of kidney damage in patients with COVID-19 were published by Chinese clinicians in the early days of the disease pandemic. Statistics confirm that in COVID-19, kidney damage was noted in an average of 0.6-7.6% of cases [7, 16, 18].

As the global pandemic progressed, reports of the frequency of kidney damage in patients with COVID-19 became more and more numerous. At the same time, statistical information on the frequency of kidney damage differed in its variability. Thus, according to S.Y. Robbins-Juarez, et al. [15] and M. Fisher, et al. [5] In the European Union, the average incidence of kidney dam-

age in patients with COVID-19 was up to 52.5%, while in the Americas it was no more than 22.3% of cases.

According to X. Yang, et al. [9], M.G. Argenziano, et al. [6] and A. Joseph, et al. [4], up to 80% of the reasons for transferring patients with COVID-19 to intensive care units were acute kidney injuries.

There are reports of dependence on the frequency of kidney damage in COVID-19 and the presence of another, including respiratory infection. For example, the reports of N.V. Kolhe, et al. [2] present an analysis of the frequency of kidney damage in patients with COVID-19 in one of the clinics in the UK. The division of patients

¹ Bukhara State Medical Institute, Bukhara, Uzbekistan, e-mail: dr.hamdamov@mail.ru

² **Corresponding author:** Chief Physician of the Sultan Hospital Private Clinic, Termez, Uzbekistan, e-mail: ilyosxursandov@gmail.com

according to the results of polymerase chain reaction showed an increase in the incidence of kidney damage 2 times higher (26.8%) than among patients with negative test results for COVID-19 (12.5%).

In 2003, an outbreak of severe acute respiratory syndrome, known as SARS, was reported in the southern regions of China. Subsequently, in 2020, during the development of the COVID-19 pandemic, J.Y. Teoh, et al. [17] conducted a comparative analysis of the frequency of renal damage in patients with these two groups of patients. As the results of the comparative analysis showed, among patients with COVID-19, kidney damage was much more common than in the SARS outbreak, although in the latter case, kidney damage was recorded quite often. The researchers concluded that kidney damage is closely related to both the presence and type of viral infection.

M.C. McAdams, et al. [20] based on their own observations, noted that acute kidney injury was a common complication in patients hospitalized with COVID-19 and often required renal replacement therapy. It was also noted that focusing on the presence of only hematuria and proteinuria cannot be sufficient in assessing kidney damage in patients with COVID-19. The study included patients with a positive PCR test result for severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) who had a complete urine test taken on admission to one of the 20 hospitals. To predict kidney damage and the need for renal replacement therapy at admission, nested models with the degree of hematuria and proteinuria were used. Presence of chronic kidney disease and baseline serum creatinine were added to improve model fit to the test. The results showed that out of 5,980 people, 829 (13.9%) developed acute renal failure during hospitalization, and 149 (18.0%) patients underwent haemodialysis. The degrees of proteinuria and hematuria significantly increased with the severity of acute renal failure ($p < 0.001$ for both). Any degree of proteinuria and hematuria was associated with an increased risk of acute renal failure and the need for haemodialysis.

A group of scientists from Brazil, led by M.P. Doherty [1], based on the results of their own observations, noted that in patients with COVID-19, acute renal failure is the most common case among multi-organ failure, in critical condition. They reported on the incidence, risk factors, associations, and outcomes of acute renal failure and renal replacement therapy in critically ill COVID-19 patients. A retrospective cohort study of adult patients diagnosed with COVID-19 admitted to the intensive care unit between March 2020 and May 2020 was conducted.

The primary outcome was 60 days of mortality after hospitalization in the intensive care unit. It was concluded that acute renal failure was common among critically ill COVID-19 patients and occurred early in combination with mechanical ventilation. One in 6 patients with acute renal failure received renal replacement therapy, and 1 in 3 patients treated with renal replacement therapy died in hospital. These results provide important prognostic information for clinicians caring for these patients.

In a scientific article titled "Epidemiology and outcomes of acute kidney injury in COVID-19 patients with acute respiratory distress syndrome", a group of scientists led by F. Wang [12] presented material where the authors retrospectively recruited consecutive adult patients with COVID-19 who were diagnosed with acute respiratory distress syndrome according to the Berlin definition from 13 designated intensive care units in the city of Wuhan, China. Potential risk factors for acute renal failure, as well as its relationship with in-hospital mortality, were investigated. A total of 275 COVID-19 patients with acute respiratory distress syndrome were included in the study, and 49.5% of them developed acute renal failure during their hospital stay. Compared with patients without acute renal failure, patients who developed it were older, had a tendency to have chronic kidney disease, had a higher score on the sepsis-related organ failure score on Day 1, and were more likely to have mechanical ventilation and develop acute organ dysfunction. Multivariate analysis showed that age, history of chronic kidney disease, neutrophil-lymphocyte ratio, and albumin levels were independently associated with the occurrence of acute renal failure. It is important to note that an increase in the severity of acute renal failure was associated with an increase in in-hospital mortality. In this multicenter retrospective study, the authors found that nearly half of COVID-19 patients with acute respiratory distress syndrome developed acute renal failure during their hospital stay. The coexistence of acute renal failure significantly increased the mortality of these patients.

There is information regarding kidney damage in COVID-19 at the stage of the outpatient period of the viral disease. Along with this, there are reports of the development of acute renal failure in patients with COVID-19 within the first two days after hospitalization of patients. At the same time, if in the first case, the development of acute renal failure will be considered community-acquired renal failure, while in the second case it is already hospital. This characteristic of kidney

damage in patients with COVID-19 has been described among elderly and senile patients [3, 13].

Different studies provide different data on the frequency of acute renal failure in patients with COVID-19 at the stage of hospitalization in the clinic. Most publications indicate a predominance of acute renal failure before hospitalization of patients in the clinic from 30% to 50% [8, 10].

Most studies regarding the incidence of kidney damage in patients with COVID-19 are also determined by the prevalence of severe disease. For example, reports by researchers from the UK led by P.D. Jewell, et al. [11] showed that half of patients with COVID-19 were diagnosed with the first stage of acute renal failure, and 1/3 of patients were diagnosed with the third stage. The second stage of acute renal failure was noted only in 13% of patients.

At the same time, J.H. Ng, J.S. Hirsch, and A. Hazzan [14] reported that in the United States during the COVID-19 pandemic, 39.9% of patients developed acute renal failure. At the same time, almost half of the patients had the first stage of acute renal failure. In the remaining cases, the second and third stages of acute renal failure were noted (22% and 36%, respectively).

In Portugal, during the COVID-19 pandemic, 554 patients were hospitalized in a clinic in serious condition. At the same time, acute renal failure was detected in 60.6% of patients, which in more than half of the cases was represented by the third stage of the disease. Other studies also indicate a high incidence of the third stage of lesions in patients with COVID-19. At the same time, the frequency of registration of this kidney lesion in COVID-19 was noted in 44% of cases [19].

Thus, as the literature shows, the heterogeneity of data, despite the use of standardized criteria for kidney damage recognized by the global medical community, the true prevalence of worsening renal function in patients with COVID-19 remains unclear. Acute renal injury is associated with increased mortality in patients with acute respiratory distress syndrome. However, the epidemiological features and outcomes of acute kidney injury in COVID-19 patients with acute respiratory distress syndrome are unknown.

Conflict of interest – no

Funding – not provided

Ethical aspects – complied with

REFERENCES:

1. Acute Kidney Injury and Renal Replacement Therapy in Critically Ill COVID-19 Patients: Risk Factors and Outcomes: A Single-Center Experience in Brazil. / M.P. Doher, F.R. Torres de Carvalho, P.F. Scherer, et al. // *Blood Purif.* 2021;50(4-5):520-530.
2. Acute kidney injury associated with COVID-19: A retrospective cohort study / N.V. Kolhe, R.J. Fluck, N.M. Selby, et al. // *PLoS Medicine.* – 2020. – Vol. 17 - No10 – P. e1003406.
3. Acute kidney injury in China: a cross-sectional survey / L. Yang, G. Xing, L. Wang, et al. // *Lancet.* – 2015. – Vol. 386 - No10002 – P. 1465–1471.
4. Acute kidney injury in patients with SARS-CoV-2 infection / A. Joseph, L. Zafrani, A. Mabrouki, et al. // *Annals of intensive care.* – 2020. - Vol. 10 - No1 – P. 117.
5. AKI in hospitalized patients with and without COVID-19. A comparison study / M. Fisher, J. Neugarten, E. Bellin, et al. // *Journal of the American Society of Nephrology: JASN.* – 2020. – Vol. 31 - No9 – P. 2145–2157.
6. Characterization and clinical course of 1000 patients with coronavirus disease 2019 in New York: retrospective case series / M.G. Argenziano, S.L. Bruce, C.L. Slater, et al. // *BMJ (Clinical research ed.).* – 2020. - Vol. 369 – P. m1996.
7. China Medical Treatment Expert Group for Covid-19. Clinical Characteristics of Coronavirus Disease 2019 in China / W.J. Guan, Z.Y. Ni, Y. Hu, et al. // *New England Journal of Medicine.* – 2020. – Vol. 382 – No 18 – P. 1708–1720.
8. Clinical Characteristics and Outcomes of Community- and Hospital- Acquired Acute Kidney Injury with COVID-19 in a US Inner City Hospital System / J. Pelayo, K.B. Lo, R. Bhargava, et al. // *Cardiorenal Medicine.* - 2020. – Vol. 10 - No4 – P. 223-231.
9. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centre, retrospective, observational study / X. Yang, Y. Yu, J. Xu, et al. // *The Lancet. Respiratory medicine.* – 2020. – Vol. 8 - No5 – P. 475–481.
10. Community- and Hospital-Acquired Acute Kidney Injury in COVID-19: Different Phenotypes and Dismal Prognosis / A.J. Martínez-Rueda, R.D. Álvarez, R.A. Méndez-Pérez, et al. // *Blood purification.* – 2021. – Vol. 50 - No6 – P. 931-941.
11. COVID-19-related acute kidney injury; incidence, risk factors and outcomes in a large UK cohort / P.D. Jewell, K. Bramham, J. Galloway, et al. // *BMC nephrology.* – 2021. – Vol. 22 - No1 – P.359.
12. Epidemiology and Outcomes of Acute Kidney Injury in COVID-19 Patients with Acute Respiratory Distress Syndrome: A Multicenter Retrospective

Study. / F. Wang, L. Ran, C. Qian, et al. // *Blood Purif.* 2021;50(4-5):499-505.

13. Incidence, outcomes, and risk factors of community-acquired and hospital-acquired acute kidney injury: a retrospective Cohort Study / C.N. Hsu, C.T. Lee, C.H. Su, et al. // *Medicine.* – 2016. – Vol. 95 - No19 – P. e3674.

14. Outcomes Among Patients Hospitalized With COVID-19 and Acute Kidney Injury / J.H. Ng, J.S. Hirsch, A. Hazzan, et al. // *American journal of kidney diseases: the official journal of the National Kidney Foundation* – 2021. - Vol. 77 - No2 – P. 204-215.e1.

15. Outcomes for patients with COVID-19 and acute kidney injury: A systematic review and meta-analysis / S.Y. Robbins-Juarez, L. Qian, K.L. King, et al. // *Kidney International Reports.* – 2020. – Vol. 5 - No8 – P. 1149–1160.

16. Renal involvement and early prognosis in patients with COVID-19 pneumonia / G. Pei, Z. Zhang, J. Peng, et al. // *Journal of the American Society of Nephrology : JASN.* – 2020. – Vol. 31 - No6 – P. 1157–1165.

17. Risks of AKI and Major Adverse Clinical Outcomes in Patients with Severe Acute Respiratory Syndrome or Coronavirus Disease 2019 / J.Y. Teoh, T.C. Yip, G.C. Lui, et al. // *Journal of the American Society of Nephrology: JASN.* – 2021. – Vol. 32 - No4 – P. 961–971.

18. The incidence, risk factors, and prognosis of acute kidney injury in adult patients with coronavirus disease 2019 / Y. Cheng, R. Luo, X. Wang, et al. // *Clinical journal of the American Society of Nephrology: CJASN.* – 2020. - Vol. 15 - No10 – P. 1394- 1402.

19. The prevalence of acute kidney injury in patients hospitalized with COVID-19 infection: A systematic review and meta-analysis / S.A. Silver, W. Beaubien-Souligny, P.S. Shah, et al. // *Kidney Medicine.* – 2021. – Vol. 3 - No1 – P. 83–98.e1.

20. Using dipstick urinalysis to predict the development of acute kidney injury in patients with COVID-19. / M.C. McAdams, M. Li, P. Xu, et al. // *BMC Nephrol.* 2022 Feb 1;23(1):50.

COVID-19 bilan og'rigan bemorlarda buyrak zararlanishi to'g'risida statistik ma'lumot

Xamdamov B.Z., Khursandov I.A.

Buxoro davlat tibbiyot instituti

ABSTRAKT

SARS-CoV-2 koronavirusi hayot uchun xavfli pandemiya kasalligiga aylandi. Ma'lumki, ushbu kasallikning asosiy ko'rinishlari o'tkir respirator distress sindromi va diffuz alveolar shikastlanishidir. Nafas olish tizimi SARS-CoV-2 ning asosiy maqsadi bo'lsa-da, organizmdagi boshqa organlarga qon aylanish tizimi orqali virus ta'sir qilishi mumkin. Dastlab buyrak shikastlanishi to'g'risidagi ma'lumotlar juda kam bo'lgan. SARS-CoV-2 da pandemiyaning dastlabki bosqichida buyrak zararlanishi to'g'risidagi adabiyotlar tabiatda tizimli bo'lmagan va engil proteinuriyadan tortib progressiv o'tkir buyrak etishmovchiligigacha bo'lgan tarqalib ketgan klinik holatlar bilan tavsiflangan.

Kalit so'zlar: SARS-CoV-2, buyrak kasalliklari, statistika