10.5152/turkjnephrol.2022.22312

Original Article

Turkish Journal of Nephrology

The Turkish Society of Nephrology 2020 Registry: COVID-19 Report

İsmail Koçyiğit[1], Nurhan Seyahi[2], Kenan Ateş[3], Gültekin Süleymanlar[4]

[1]Division of Nephrology, Erciyes University, Faculty of Medicine, Kayseri, Türkiye
[2]Division of Nephrology, İstanbul University, Faculty of Medicine, İstanbul, Türkiye
[3]Division of Nephrology, Ankara University, Faculty of Medicine, Ankara, Türkiye
[4]Division of Nephrology, Akdeniz University, Faculty of Medicine, Antalya, Türkiye

ABSTRACT

Objective: The Turkish Society of Nephrology Registry collects data on hemodialysis, peritoneal dialysis, and transplantation annually. Registry reports are printed every year as a booklet, and this is the 30th year of registry reports. Unlike previous years, registry reports include an additional chapter this year due to the Coronavirus Disease 2019 (COVID-19). The effects and results of the COVID-19 pandemic on kidney replacement therapies are presented in the 2020 reports.

Methods: In this article, we obtained data from the Turkish Society of Nephrology 2020 registry report and summarized the coronavirus disease 2019-associated data and statistics for kidney failure with replacement therapy patients.

Results: The number of patients on kidney replacement therapies was 83 350 individuals at the end of 2020. Totally, 1610 kidney replacement therapy patients were infected with severe acute respiratory syndrome coronavirus 2. Hemodialysis had the highest frequency of coronavirus disease 2019 (19.5%), followed by transplantation (12.2%) and peritoneal dialysis (8.6%). The mortality rate was highest in peritoneal dialysis patients with 29.6%, 24.4% in hemodialysis, and 11.2% in kidney transplant recipients.

Conclusions: Coronavirus disease 2019 has significant effects on the survey of patients undergoing kidney replacement therapies through severe complications.

Keywords: COVID-19, Hemodialysis, peritoneal dialysis, registry, transplantation

Corresponding author: İsmail Koçyiğit ✉ iikocyigit@gmail.com

Received: March 7, 2022 **Accepted:** May 24, 2022

Cite this article as: Koçyiğit İ, Seyahi N, Ateş K, Süleymanlar G. The turkish society of nephrology 2020 registry: COVID-19 report. *Turk J Nephrol.* 2022;31(3):225-229.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) caused a global outbreak in Wuhan, China, and resulted in a pandemic at the end of 2019.[1] Coronavirus disease 2019 has variable clinical features ranging from asymptomatic to respiratory failure. Severe illness can occur in otherwise healthy individuals of any age, but it frequently emerges in adults with older age or comorbidity. Several demographic features and laboratory abnormalities have also been associated with the severe disease.

Chronic kidney disease (CKD) is listed as comorbidity related to undesired outcomes in the COVID-19 course. Patients undergoing hemodialysis (HD) therapy are at high risk of severe complications if infections occur because their immune systems are suppressed and have significant comorbidities.[2] A meta-analysis of 4 studies indicated a 3-fold increased possibility for severe COVID-19.[3] Hospitalized COVID-19 patients with CKD, including CKD G3-G5, HD, and kidney transplant recipients (KTRs), have significantly higher mortality than patients without kidney disease. Chronic kidney disease G3-G5 patients have an in-hospital mortality rate as much as HD patients, which may be in part because of their similar age and comorbidity burden.[4]

Patients on kidney replacement therapy (KRT) comprise a vulnerable population, and the mortality rate of COVID-19 has increased in all modalities.[5,6] Coronavirus disease 2019 is common among patients receiving maintenance dialysis, particularly those residing in congregate settings. Also, results reveal that COVID-19-related mortality rate exceeds 20% among maintenance dialysis patients.[7]

This article purposes to present the frequency, diagnosis, survival, and death rates of COVID-19 in patients with KRT in Türkiye in 2020.

METHODS

In this article, we provide a summary of the 2020 registry report. More comprehensive and detailed data can be found in the booklet "Registry of the nephrology, dialysis, and transplantation in Türkiye, Registry 2020" published by the Turkish Society of Nephrology (TSN). Current and previous reports can be accessed from the website of the TSN (www.tsn.org.tr). We collected data from selected kidney replacement therapy centers; moreover, we extensively used a database under the supervision of the Ministry of Health to obtain complete data. This approach is used since 2012.

RESULTS

The registry report contains an analysis of data from 66 centers in Türkiye. While TSN has been publishing registry reports for many years, it has been in contact with centers whose data are reliable and robust. Primarily, patients were evaluated for KRT modalities and the frequency of COVID-19 was determined for each group. The disease frequency was determined as most frequent in the HD group (19.5%). The results are summarized in Table 1 and demonstrated in Figure 1.

The diagnosis methods of patients infected with SARS-CoV-2 were analyzed, and reverse transcriptase-polymerase chain reaction (PCR) was determined as the most frequent method used in all KRT modalities. The results are summarized in Table 2.

The COVID-19 mortality rate was investigated and the highest mortality rate was determined in the peritoneal dialysis (PD) group (29.6%). The results are summarized in Table 3 and demonstrated in Figure 2.

MAIN POINTS

- Coronavirus disease 2019 (COVID-19) has a high complication rate worldwide, especially in patients with comorbidities like chronic kidney disease.
- The incidence of COVID-19 is highest in hemodialysis patients, and this is due to the fact that it is a center-based treatment.
- All kidney replacement therapies have a high risk of mortality in COVID-19.

Table 1. Numbers and Frequencies of COVID-19 in Kidney Replacement Therapy Patients

Patients	Kidney Replacement Therapy Modalities		
	Hemodialysis	Peritoneal Dialysis	Transplantation
Total	5.357	963	5102
Infected	1.049	118	443
Frequency (%)	19.58	12.25	8.68

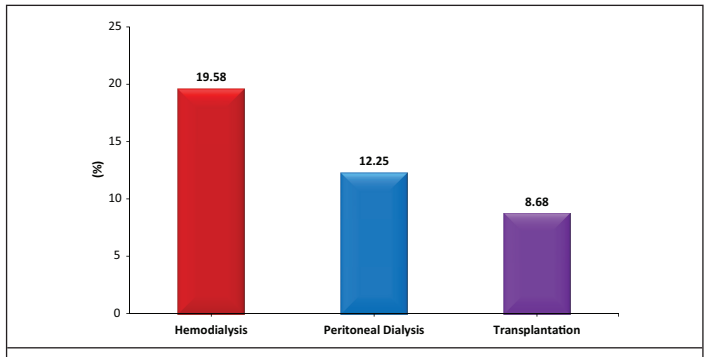

Figure 1. Coronavirus disease 2019 frequency in kidney replacement therapy modalities

The complications of COVID-19 in 443 KTRs during and after disease are listed and summarized in Table 4.

Hemodialysis Evaluation

In the analysis of HD center data, 56.6% of the centers were within the hospital, where COVID-19 patients were admitted and hospitalized.

Dialysis in a separate room was determined as the most frequent (62.1%) arrangement in HD centers for COVID-19-diagnosed patients during the pandemic.

The analysis of the distribution of HD patients with COVID-19 by dialysis duration revealed that the 1-5 years subgroup was the most frequent (40.5%) in 2020. Nasopharyngeal swab PCR was the most commonly (88.2%) used diagnostic method for COVID-19 in HD patients. Diabetes mellitus was determined as the most frequently (45.1%) accompanied comorbidity in 1049 HD patients with COVID-19 in 2020.

Distribution of HD patients with COVID-19 by follow-up and treatment type were analyzed, and hospitalization in a pandemic clinic was determined as the most frequent (31.7%) application in 2020. The distribution of HD patients, who died due to COVID-19 by dialysis duration, was analyzed and the over 20-year age group was determined as the most frequent (31.7%) in 2020. Malignancy was determined as the most frequently (41.3%) accompanied comorbidity to death in HD patients due to COVID-19 in 2020.

Table 2. Analysis of COVID-19 Diagnostic Methods in Kidney Replacement Therapy Modalities

COVID-19 Diagnostic Method	Hemodialysis		Peritoneal Dialysis		Transplantation	
	n	%	n	%	n	%
Nasopharyngeal swab PCR	926	88.27	95	80.51	388	87.58
Antibodies (SARS-CoV-2 IgM/IgG)	22	2.10	5	4.24	0	0
Only Lung CT	99	9.44	15	12.71	33	7.45
Unknown	2	0.19	3	2.54	22	4.97

CT, computed tomography PCR, polymerase chain reaction.

Table 3. Mortality Rate of Kidney Replacement Therapy Patients with COVID-19 Diagnosis by Modalities

Patients	Hemodialysis	Peritoneal Dialysis	Transplantation
Infected	1.049	118	443
Death	256	35	50
Mortality (%)	24.40	29.66	11.29

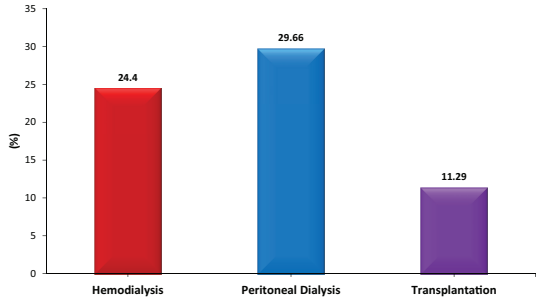

Figure 2. Coronavirus disease 2019 mortality rate in kidney replacement therapy modalities.

Peritoneal Dialysis Evaluation

In the analyzed data from PD centers, 87,8% of centers were within the hospital, where COVID-19 patients were admitted and hospitalized.

Table 4. Frequencies of COVID-19-Related Complications in Kidney Transplant Recipients

Complications	n	%
Temporary HD/HDF/PD requirement	18	4.06
Permanent transition to dialysis in the first 3 months	2	0.45
More than 20% increase in creatinine level in the first 3 months	49	11.06
Acute rejection attack in the first 3 months	0	0
Venous or arterial thrombosis	5	1.13

HDF, hemodiafiltration; HD, hemodialysis; PD, peritoneal dialysis.

In the distribution of PD patients with COVID-19 by type of PD modality in 2020, the automated peritoneal dialysis (APD) group has 13.2% frequency and continuous ambulatory peritoneal dialysis (CAPD) has 11.7% frequency. In the distribution of PD patients with COVID-19 by dialysis duration analysis, 44.9% of patients had 1-5 years duration in 2020. Nasopharyngeal swab PCR was the most commonly (80.5%) used diagnostic method for COVID-19 in PD patients. Diabetes mellitus was determined as the most frequently (24.5%) accompanied comorbidity in 118 PD patients with COVID-19 in 2020. In the distribution of PD patients with COVID-19 by follow-up and treatment type, hospitalization in pandemic clinics was determined as the most frequent (43.2%) application in 2020. In the distribution of COVID-19-related death in PD patients by dialysis duration, the 16-20 years subgroup has the highest frequency (50.0%). Diabetes mellitus was determined as the most frequently (48.2%) accompanied comorbidity in PD patients who died due to COVID-19 in 2020. Temporary HD or hemodiafiltration requirement was determined as the most frequent (15.2%) COVID-19 complication in 118 PD patients during and after disease in 2020.

Kidney Transplantation Evaluation

Data analysis from transplantation centers showed that 90% of centers were within the hospital, where COVID-19 patients were admitted and hospitalized.

In the analysis of COVID-19 frequency in the KTRs by donor type, 8.7% was found in living-donors and 8.2% in deceased donors. In the analysis of allograft survival in KTRs with COVID-19 diagnosis, 6-10 years were determined as the most frequent (40.8%). Nasopharyngeal swab PCR was the most commonly (87.5%) used diagnostic method for COVID-19 in KTRs. Diabetes mellitus was determined as the most frequently (32.0%) accompanied comorbidity in 443 KTRs with COVID-19 in 2020. In the analysis of the distribution of KTRs with COVID-19 by follow-up and treatment, ambulatory follow-up was the most frequent (45.1%) application in 2020. In the distribution of COVID-19-related death rate by age in KTRs, the most frequent subgroup was the 65-74-years-old group (29.1%) in 2020. In the distribution of COVID-19-related death in KTRs by allograft survival, the 11-15 years subgroup was determined as the highest frequency

(16.2%). Malignancy was determined as the most frequent (25.0%) comorbidity accompanying COVID-19-related death in KTRs.

DISCUSSION

Turkish Society of Nephrology Registry collects data on HD, PD, and transplantation annually. Unlike previous years, the registry report includes an additional chapter in 2020 due to the COVID-19 pandemic. The presentation of COVID-19 effect on KRT is important because of the requirement for dialysis practice arrangements.

COVID-19 also influenced patients with CKD, kidney allograft recipients, and patients on dialysis. CKD was listed in comorbidities classified as risk factors for severe COVID-19 by the Centers for Disease Control and Prevention in 2021.[8] The SARS-CoV-2 infection mortality rate was significantly higher among CKD patients than in patients with normal kidney functions, and severe disease risk increased.[9,10]

Furthermore, kidney failure with replacement therapy (KFRT) patients receiving in-center HD have a remarkably increased risk of infection with SARS-CoV-2 than HD patients, who received care via telehealth and home dialysis.[11] Also, infected center dialysis HD patients simplify the transmission of the virus due to thrice-weekly travel to a center with groups and exposure to patients and staff at the dialysis unit.[12]

Patients with KFRT, who are on PD, can continue dialysis while safely self-isolating at home. Indeed, the International Society of Peritoneal Dialysis has provided recommendations on the management of patients receiving PD in the setting of COVID-19. This report advised that people on PD should stay at home, and hospital visits should be minimized and reserved only for urgent needs.[13]

Most KTRs tend to have infections and malignancies because of lifelong immunosuppressive therapy. Consequently, an increased risk of severe COVID-19 and complications are observed among KTRs due to chronic immunosuppression and comorbidities.[14]

The COVID-19 pandemic has led to significant changes in KRT practice. In particular, many centers had to suspend their transplantation activities, and as a result, the number of patients who underwent kidney transplantation decreased significantly compared to previous years. In addition, routine follow-up of PD and transplant patients has been disrupted.

As expected, the COVID-19 transmission rate was highest in in-center HD patients (19.5%) and lowest in kidney transplant patients (8.7%), 12.2% of PD patients infected with SARS-CoV-2. These results support the importance of isolation in preventing infection. The highest mortality rate was determined in PD patients, and this circumstance may have resulted from the disruption in the routine follow-up of the patients and late diagnosis. Although COVID-19 infection affected patients from all age groups at approximately similar rates, it was noted that the death rate gradually increased with age. Therewithal, the mortality rate was dramatically higher in patients with co-morbidities, such as diabetes, chronic obstructive pulmonary disease, and heart failure.[8]

The registry does not include data about COVID-19 vaccination in KRT patients because vaccines were not approved in 2020 in Türkiye. In conclusion, we believe that these data are significant not only for nephrology practice but also provide utility for improving new strategies to struggle with COVID-19.

Ethics Committee Approval: The article summarizes data from the 2020 registry report.

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – N.S., İ.K., K.A., G.S.; Design – N.S., İ.K., K.A., G.S.; Supervision – N.S., İ.K., K.A., G.S.; Data Collection and/or Processing – N.S., İ.K., K.A., G.S.; Analysis and/or Interpretation – N.S., İ.K., K.A., G.S.; Literature Review – N.S., İ.K., K.A., G.S.; Writing – N.S., İ.K., K.A., G.S.; Critical Review – N.S., İ.K., K.A., G.S.

Acknowledgments: We thank the staff of dialysis and transplantation centers who have provided regular information to our board for years.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

REFERENCES

1. Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents*. 2020;55(3):105924. [CrossRef]
2. Demirag H, Hintistan S. Coronavirus disease 2019 infection and nursing in patients undergoing hemodialysis treatment. *Turk J Nephrol*. 2020;29(4):315-321. [CrossRef]
3. Henry BM, Lippi G. Chronic kidney disease is associated with severe coronavirus disease 2019 (COVID-19) infection. *Int Urol Nephrol*. 2020;52(6):1193-1194. [CrossRef]
4. Ozturk S, Turgutalp K, Arici M, et al. Mortality analysis of COVID-19 infection in chronic kidney disease, haemodialysis and renal transplant patients compared with patients without kidney disease: a nationwide analysis from Turkey. *Nephrol Dial Transplant*. 2020;35(12):2083-2095. [CrossRef]

5. Nacif LS, Zanini LY, Waisberg DR, et al. COVID-19 in solid organ transplantation patients: A systematic review. *Clinics (Sao Paulo)*. 2020;75:e1983. [CrossRef]
6. Hilbrands LB, Duivenvoorden R, Vart P, et al. COVID-19-related mortality in kidney transplant and dialysis patients: results of the ERACODA collaboration. *Nephrol Dial Transplant*. 2020;35(11):1973-1983. [CrossRef]
7. Hsu CM, Weiner DE, Aweh G, et al. COVID-19 Among US dialysis patients: risk factors and outcomes From a national dialysis provider. *Am J Kidney Dis*. 2021;77(5):748-756.e1. [CrossRef]
8. Gao Yd, Ding M, Dong X, et al: Risk factors for severe and critically ill COVID-19 patients: a review. *Allergy.* 2021;76(2):428-455.
9. Cai R, Zhang J, Zhu Y, Liu L, Liu Y, He Q. Mortality in chronic kidney disease patients with COVID-19: a systematic review and meta-analysis. *Int Urol Nephrol*. 2021;53(8):1623-1629. [CrossRef]
10. Khan MMA, Khan MN, Mustagir MG, Rana J, Islam MS, Kabir MI. Effects of underlying morbidities on the occurrence of deaths in COVID-19 patients: a systematic review and meta-analysis. *J Glob Health*. 2020;10(2):020503. [CrossRef]
11. Lew SQ, Wallace EL, Srivatana V, et al. Telehealth for home dialysis in COVID-19 and beyond: a perspective from the American Society of Nephrology COVID-19 home dialysis subcommittee. *Am J Kidney Dis*. 2021;77(1):142-148. [CrossRef]
12. Perl J, Thomas D, Tang Y, et al. COVID-19 among adults receiving home versus in-center dialysis. *Clin J Am Soc Nephrol*. 2021;16(9):1410-1412. [CrossRef]
13. Brown E, Arteaga J, Chow J, Dong J, Liew A, Perl J. Strategies regarding COVID-19 in PD patients adapted from Peking University First Hospital 28th Mar 2020. Guidelines, International Society for Peritoneal Dialysis: 2-3; 2020.
14. Azzi Y, Parides M, Alani O, et al. COVID-19 infection in kidney transplant recipients at the epicenter of pandemics. *Kidney Int*. 2020;98(6):1559-1567. [CrossRef]