Journal of Communicable Diseases
Volume 54, Issue 2 - 2022, Pg. No. 28-32
Peer Reviewed & Open Access Journal

Research Article

Effect of Coronavirus among Kidney Disease Patients

Ahmed Fadhil Idan[1], Ali Jasem Hashem[2], Talib Attea Salman[3]

[1]Internist, [2]Head, [3]Consultant Internist, Nephrologist, Baghdad Medical City, Iraq.
DOI: https://doi.org/10.24321/0019.5138.202267

I N F O

Corresponding Author:
Ahmed Fadhil Idan, Nephrologist, Baghdad Medical City, Iraq.
E-mail Id:
alkafagiahmed8@gmail.com
Orcid Id:
https://orcid.org/0000-0002-2223-6642
How to cite this article:
Idan AF, Hashem AJ, Salman TA. Effect of Coronavirus among Kidney Disease Patients. J Commun Dis. 2022;54(2):28-32.

Date of Submission: 2022-01-08
Date of Acceptance: 2022-06-04

A B S T R A C T

Background: COVID-19 is a novel coronavirus disease caused by the severe acute respiratory syndrome coronavirus 2. Chronic kidney disease (CKD) is associated with an increased risk of both inpatient and outpatient pneumonia.

Objective: To describe the effect of COVID-19 virus on patients with kidney disease and renal transplants and analyse the outcomes of patients at the time of the study.

Patients and Method: This is a descriptive study conducted in Baghdad Medical City, Al Shifa Center (single centre study). The study included 13 RTPCR-positive patients who were screened in the inpatient and outpatient departments. All patients received treatment according to the Iraq Ministry of Health protocol with dose adjusted as per the glomerular filtration rate (GFR).

Result: The mean age of participants was 51.46 years with males more than females. Among the positive cases, 2 had acute kidney injury (15.4%), 3 had chronic kidney diseases (23.1%), 5 had end-stage renal disease (38.5%), and 3 had had renal transplants (23.1%). 6 patients out of 13 were diabetic, 11 were hypertensive, and 1 patient had heart failure. 7 (53.8%) patients were given conservative treatment, 4 were given isolated conventional haemodialysis, and only 2 patients were kept in an intensive care unit on continuous renal replacement therapy. 2 male patients died during the treatment.

Conclusion: Chronic kidney disease is a risk factor for COVID-19 infection and more mortality and infection were found in male patients as compared to female patients in our study.

Keywords: COVID-19, Chronic Kidney Disease (CKD), Haemodialysis (HD)

Introduction

COVID-19 is a novel coronavirus disease caused by the severe acute respiratory syndrome coronavirus 2. Patients with COVID-19 may be asymptomatic or symptoms may appear 2-14 days after exposure. Patients usually present with fever (44%-98%), cough (68%-76%), myalgia (18%), and fatigue (18%).[1,2]

The infectivity of this virus is high enough to assure a pandemic spread if no mitigating efforts are made to stop it. COVID-19 is transmitted through droplets and close

contact; it is highly contagious and has insidious symptoms after infection. Mortality has been estimated at 3.6% in the general population,[1,2] but could be higher or lower as new cases emerge.[3] Children have been found to have few complications and less mortality.[4] Old age and comorbid hypertension, diabetes, and organ dysfunction are the risk factors for adult respiratory distress syndrome and death.[5] Chronic kidney disease (CKD) is associated with an increased risk of both inpatient and outpatient pneumonia.[6] The pneumonia-related mortality rate in CKD patients seems to be 14-16 times higher than in the general population.[7]

The patients in dialysis centres are relatively dense and mobile, and the particularity of patients with uraemia who require long-term haemodialysis makes it more difficult to prevent and control infectious diseases than in the general population.[8] Closed spaces in dialysis centres can easily cause the virus to spread. The target of SARS-CoV-2 on the human body is mainly the lower respiratory tract, and it manifests as viral pneumonia. The sensitivity of a single throat swab early in the course of the disease is only 70%,[9] and chest CT examination is faster and more effective than aetiologic examination for screening of COVID-19. It was recommended to set up designated dialysis hospitals to centrally isolate and manage the numerous patients with COVID-19 on haemodialysis in epidemic areas and to perform chest CT screening for all patients on haemodialysis in non-designated hospitals.

The following are some of the critical points in mitigating the risk of COVID-19 in dialysis facilities:

- Education and information about COVID-19 should be provided to patients on haemodialysis and the accompanying personnel. This included avoidance of large gatherings, maintenance of hand hygiene, and standardisation of the correct use of protective equipment
- Compulsory temperature checks should be performed on every patient before entering the haemodialysis facilities
- Screening: Patients with symptoms, those who have travelled to endemic areas, or those who have had contact with persons infected with COVID-19 should be tested
- Cluster medical activities like large shifts, group rounds, group studies, and patient discussions should be reduced, and instead, they should be held by telephone or through the internet
- All staff members should be required to take body temperature and observe respiratory symptoms every day
- All workers should take protective measures and effective precautions
- Environmental disinfection should be done

The objective of this study was to assess the impact of COVID-19 on kidney disease patients.

Methodology

This descriptive study was conducted in Baghdad Medical City, Al Shifa Center from 24 February to 18 April 2020. A large number of patients were screened, 13 patients were found to have renal disease and COVID-19 infection (tested by RTPCR). Samples were collected from nasopharyngeal swabs and blood.

Inclusion Criteria

- All patients with elevated renal indices or abnormal radiological kidney appearance or transplanted kidneys or patients on haemodialysis
- COVID-19 positive patients

Exclusion Criteria

- The paediatric age group (below 16 years old) was excluded
- All patients were evaluated by a pulmonologist, radiologist, and nephrologist. Formal consent was taken from all patients, and ethical clearance was obtained from the authority of the Medical City

Results

The mean age of participants was 51.46 years (Table 1). The number of males was higher than females (2.25:1). The participants included 2 acute kidney injury patients (15.4%), 3 chronic kidney disease patients (23.1%), 5 end-stage renal disease patients (38.5%), and 3 patients with renal transplant procedure (23.1%). 6 patients out of 13 were diabetic, 11 were hypertensive, and 1 patient had heart failure. 7 (53.8%) participants were given conservative treatment, 4 were given isolated conventional haemodialysis, and only 2 patients were kept in an intensive care unit on continuous renal replacement therapy.

2 male patients had died (Figure 1). Their ages were 51 and 69 years. The mean age of patients who did not survive (60 years) was slightly more than that of survived patients but the variable of age was not found to be statistically significant with the outcome of the participant (Table 2).

The clinical characteristics of the two patients who did not survive can be summarised as; the first one was a 69 years old male, suffering from end-stage renal disease and diabetes mellitus. He was hypertensive and had heart failure, and the other one presented with transplant rejection, hypertension, and diabetes mellitus. He was hepatitis B and C positive and was admitted to the intensive care unit because of severe respiratory symptoms, and Continuous Renal Replacement Therapy (CRRT) was started. The clinical characteristics of the dead patients were not statistically different from those of survived patients regarding renal disease category and associated morbidity (Table 3).

ISSN: 0019-5138
DOI: https://doi.org/10.24321/0019.5138.202267

Table 1.Demographic and Clinical Characteristics of COVID-19 Positive Cases (n = 13)

Variables		Values
Age (years) Mean ± SD Range (Min-Max)		51.46 ± 11.1 36 (33-69)
Duration		2-4 weeks
Gender	Female	4 (30.8%)
	Male	9 (69.2%)
Case	AKI	2 (15.4%)
	CKD	3 (23.1%)
	ESRD	5 (38.5%)
	Transplant	3 (23.1%)
Diabetes Mellitus		6 (46.2%)
Hypertension		11 (84.6%)
HF		1 (7.7%)
Action	Conservative	7 (53.8%)
	Isolated conventional HD	4 (30.8%)
	CRRT	2 (15.4%)

AKI: Acute Kidney Injury;CKD: Chronic Kidney Disease; ESRD: End-Stage Renal Disease;CRRT: Continuous Renal Replacement Therapy

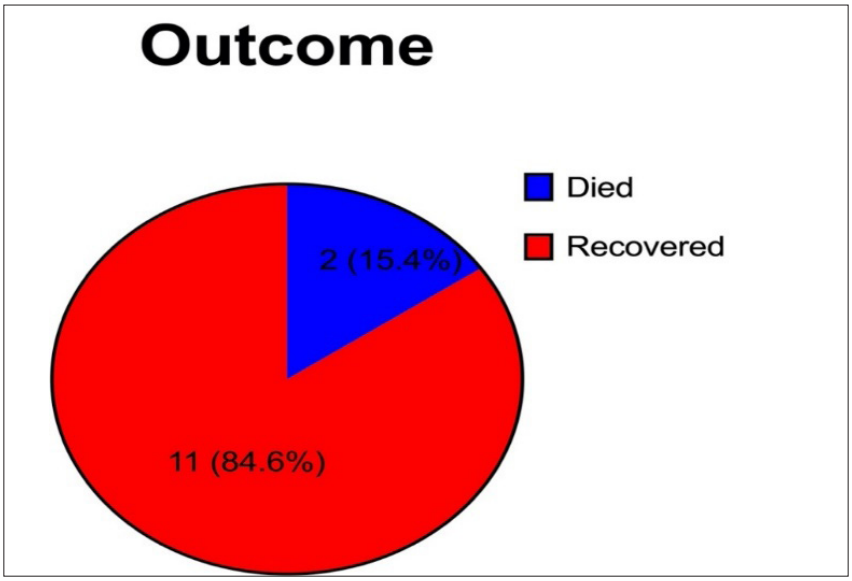

Figure 1.Status of Participants after Treatment

Table 2.Ages of Patients according to the Outcome of COVID-19 Infection

	Outcome			
	Death		Improvement	
	Mean	Standard Deviation	Mean	Standard Deviation
Age (years)	60.00	12.73	49.91	10.70
P value	0.392^{NS}			

NS: no statistical significance (p>0.05)

ISSN: 0019-5138
DOI: https://doi.org/10.24321/0019.5138.202267

Table 3.Clinical Characteristics of Patients according to the Outcome of COVID-19 Infection

		Outcome				Total	P value
		Died n	%	Improved n	%		
Case	AKI	0	0.00	2	100.00	2	0.629 NS
	CKD	0	0.00	3	100.00	3	
	ESRD	1	20.00	4	80.00	5	
	Transplant	1	33.33	2	66.67	3	
Gender	Female	0	0.00	4	100.00	4	1.000 NS
	Male	2	22.22	7	77.78	9	
DM	Yes	2	33.33	4	66.67	6	0.192 NS
	No	0	0.00	7	100.00	7	
HT	Yes	2	18.18	9	81.82	11	1.000 NS
	No	0	0.00	2	100.00	2	
HF	Yes	1	100.00	0	0.00	1	0.153 NS
	No	1	8.33	11	91.67	12	

AKI: Acute Kidney Injury; CKD: Chronic Kidney Disease; ESRD: End-Stage Renal Disease; NS: no statistical significance (p>0.05)

Discussion

Our results revealed that COVID-19 infection is more common in males than females similar to the finding in another study.[10] Regarding the mortality rate in our study, it was seen that men are more likely to not survive the coronavirus infection as compared to women. A similar result was seen in studies from China, Italy[2] and from nearly 20 other countries. Scientists suspect that unhealthy habits like smoking and underlying health issues among men could be influencing this trend. The mean age of our patients was 50 years because we studied only kidney disease patients and this disease is more common among old persons. Most of our patients (53%) showed self-limited cure with supportive treatment and close follow-up with no need to further intervention compatible with international guideline and study in which 80% of patients showed spontaneous cure, 15% were hospitalised, and 5% mortality.[11]

The mortality rate in our patients was 15% which is higher than the general population (without kidney disease). This was in agreement with other studies which showed that comorbidity increased mortality[12] since CKD is considered to be an important comorbidity that increased death among COVID-19 patients. 2 patients died in our study due to acute respiratory distress syndrome. They were admitted to the intensive care unit and intubated along with continuous renal replacement therapy.

An interesting finding was that the age of patients has no significant effect on mortality. This is against the findings of another study which showed that elderly patients have a higher rate of death.[13] A possible explanation of this difference could be that the mean age of our patients was 50 years (we enrolled just renal disease patients).

In our study, 3 transplanted patients had positive results. All of them were on (calcinurin inhipitor-antiprolifrative-steroid), first action was drug modulating include stop antiprolifrative treatment and decrease the calcinurin drugs for 2 patients with anti-viral according to Iraq Ministry of Health protocol, both of them cured after 3 weeks. One out of three transplanted patients died (one of two died in our study) where patient suffered from acute respiratory distress and high-grade fever.

All immunosuppressive treatment was stopped and antiviral treatment was started. They were admitted to ICU, intubated and chronic renal replacement therapy (CRRT) was started.

2 patients with acute kidney injury, who were kept for 2 weeks on conservative treatment and antiviral protocol without any specific intervention, were cured.

Conclusion

The mortality rate due to coronavirus infection was more in men as compared to women. Half of the patients showed self-limited disease with supportive treatment and close follow-up with no need for further intervention. The mortality rate in patients with CKD was higher than that in the general population who had no kidney disease. Even in patients who were on immunosuppressive treatment (renal transplant patients), the immune modulating and effective antiviral protocol may be helpful in the cure of this infection. Early diagnosis is an important factor for a better outcome

ISSN: 0019-5138
DOI: https://doi.org/10.24321/0019.5138.202267

of coronavirus infection. All CKD patients with COVID-19 positive results need hospitalisation regardless of symptoms because they are in a higher risk group. Immune-modulating treatment should be stopped or at least decreased in a patient on immunosuppressant treatment.

Source of Funding: None

Conflict of Interest: None

References

1. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z, Yu T, Xia J, Wei Y, Wu W, Xie X, Yin W, Li H, Liu M, Xiao Y, Gao H, Guo L, Xie J, Wang G, Jiang R, Gao Z, Jin Q, Wang J, Cao B. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 Feb 15;395(10223):497-506. [PubMed] [Google Scholar]
2. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DS, Du B, Li LJ, Zeng G, Yuen KY, Chen RC, Tang CL, Wang T, Chen PY, Xiang J, Li SY, Wang JL, Liang ZJ, Peng YX, Wai L, Liu Y, Hu YH, Peng P, Wang JM, Liu JY, Chen Z, Li G, Zheng ZJ, Qiu SQ, Luo J, Ye CJ, Zhu SY, Zhong NS; China Medical Treatment Expert Group for Covid-19. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382(18):1708-20. [PubMed] [Google Scholar]
3. Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. Lancet Infect Dis. 2020 Jul;20(7):773. [PubMed] [Google Scholar]
4. Kliger AS, Silberzweig J. Mitigating risk of COVID-19 in dialysis facilities. Clin J Am Soc Nephrol. 2020 May 7;15(5):707-9. [PubMed] [Google Scholar]
5. Wu C, Chen X, Cai Y, Xia J, Zhou X, Xu S, Huang H, Zhang L, Zhou X, Du C, Zhang Y, Song J, Wang S, Chao Y, Yang Z, Xu J, Zhou X, Chen D, Xiong W, Xu L, Zhou F, Jiang J, Bai C, Zheng J, Song Y. Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China. JAMA Intern Med. 2020 Jul 1;180(7):934-43. [PubMed] [Google Scholar]
6. Chou CY, Wang SM, Liang CC, Chang CT, Liu JH, Wang IK, Hsiao LC, Muo CH, Huang CC, Wang RY. Risk of pneumonia among patients with chronic kidney disease in outpatient and inpatient settings: a nationwide population-based study. Medicine. 2014 Dec;93(27). [PubMed] [Google Scholar]
7. Sarnak MJ, Jaber BL. Pulmonary infectious mortality among patients with end-stage renal disease. Chest. 2001 Dec;120(6):1883-7. [PubMed] [Google Scholar]
8. Park HC, Lee YK, Lee SH, Yoo KD, Jeon HJ, Ryu DR, Kim SN, Sohn SH, Chun RW, Choi KB; Korean Society of Nephrology MERS-CoV Task Force Team. Middle East respiratory syndrome clinical practice guideline for hemodialysis facilities. Kidney Res Clin Pract. 2017 Jun;36(2)):111-6. [PubMed] [Google Scholar]
9. Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, Ji W. Sensitivity of chest CT for COVID-19: comparison to RT-PCR. Radiology. 2020 Aug;296(2):E115-7. [PubMed] [Google Scholar]
10. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) - China, 2020. China CDC Wkly. 2020 Feb 21;2(8):113. [PubMed] [Google Scholar]
11. World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report-13, 2020.
12. Kobayashi T, Jung SM, Linton NM, Kinoshita R, Hayashi K, Miyama T, Anzai A, Yang Y, Yuan B, Akhmetzhanov AR, Suzuki A, Nishiura H. Communicating the risk of death from novel coronavirus disease (COVID-19). J Clin Med. 2020 Feb;9(2):580. [PubMed] [Google Scholar]
13. Read JM, Bridgen JR, Cummings DA, Ho A, Jewell CP. Novel coronavirus 2019-nCoV (COVID-19): early estimation of epidemiological parameters and epidemic size estimates. Philos Trans R Soc Lond B Biol Sci. 2021;376(1829):20200265. [PubMed] [Google Scholar]