

Outcome of chronic kidney disease patients with COVID-19 infection under maintenance dialysis: a retrospective observational study

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ABSTRACT

Introduction: Chronic Kidney Disease is an important risk factor for severe COVID. Emerging evidence suggests that CKD is a key risk factor for mortality in patients with COVID-19. In this article we explore the outcomes of CKD patients with COVID19 infection further.

Method: This was a retrospective observational study conducted in the dialysis unit of Department of Internal Medicine of Patan Academy of Health Sciences. All CKD patients under maintenance hemodialysis diagnosed with PCR positive COVID-19 from July 2021 to July 2022 were included in the study. The exclusion criteria were the patients newly diagnosed acute kidney injury on CKD patient with COVID-19 and COVID-19 positive patients with just antigen testing. The primary outcome of the study was in-hospital mortality. 101 patients were reviewed for this study

Result: Majority of the patients were male (73%). 42.57% of those admitted required ICU, 64.35% recovered and mortality was 35.64%.

Conclusion: CKD requiring maintenance dialysis is associated with adverse outcomes in patients with COVID-19.

Keyword: COVID-19, Chronic Kidney Failure, SARS-CoV-2

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INTRODUCTION

Prevalence of Chronic Kidney Disease (CKD) in adult population is estimated to be 10-15%, with 850 million people estimated to have CKD globally.¹ CKD is projected to become fifth leading cause of death by 2040 worldwide.² Apart from cardiovascular causes, infections account for 20% of mortality in patients with End stage renal disease (ESRD). Both innate and adaptive immune system is altered in CKD leading to disabled immune response and increased susceptibility to infection.³

Diabetes, hypertension, cardiovascular diseases are considered risk factors for severe COVID-19, but CKD emerged as the most common risk factor for severe COVID-19 and is second strongest risk factor for severe COVID-19 after age.³ Patients with ESRD are more susceptible to develop COVID-19 due to weakened immune system and more regular hospital visits.⁴ Emerging evidence also indicates that CKD is a key risk factor for mortality in patients with COVID-19.⁵ Dialysis (aHR 3.69), organ transplantation (aHR 3.53), and CKD (aHR 2.52 for patients with eGFR<30mL/min/1.73 m²) represent three of the four co-morbidities associated with the highest mortality risk from COVID-19. The risk associated with CKD Stages 4 and 5 is higher than the risk associated with diabetes mellitus (aHR range 1.31–1.95) or chronic heart disease (aHR 1.17).¹ Studies have shown the association between preexisting CKD and severe COVID-19. In one study the mortality in CKD patient with COVID-19 was found to be as high as 53.3%.⁶ However, a recent study failed to show the link between dialysis dependency and fatal outcome in CKD patient infected with COVID-19.⁷

METHOD

This was a retrospective observational study conducted in the dialysis unit of Department of Internal Medicine of Patan Academy of Health Sciences, after approval from Institutional Review

Board (IRB). Data for the study were collected from 04/25/2022-06/21/2022 from the COVID-19 data stored in hospital database of dialysis unit and Intensive Care Unit (ICU) of Patan Academy of Health Sciences. CKD patient under maintenance hemodialysis who got diagnosed with PCR positive COVID-19 from July 2021 to July 2022 were included in the study. The exclusion criteria were the patients newly diagnosed acute kidney injury on CKD patient with COVID-19 and COVID-19 positive patient with just antigen testing. The collected data was analyzed by using Microsoft Excel 2016 and SPSS 2016. The primary outcome of the study was in-hospital mortality. The secondary outcome was ICU transfer from the hemodialysis ward and discharge with recovery. All patients admitted to the Patan hospital isolation unit due to COVID-19 infection with pre-existing chronic kidney disease under maintenance dialysis from the start of COVID-19 pandemic i.e. from July 2020- July 2021 were included which was 101 in total.

RESULT

In this study, a total of 101 patients with PCR positive COVID-19 who were under maintenance hemodialysis for CKD were included. Out of them majority were male 74 (73.26%) and 27 (26.73%) were female. Among the total number of patients, more than half were above 60 years of age 52 (51.48%) whereas 49 (48.51%) were greater than 60 years of age as shown in Table 1.

The outcome of the study in terms of age and gender is shown in Table 2. Among the 101 patients, 64.35% recovered while there was mortality of 35.64%. Majority of the death was among male and age 60 or less i.e 26.73% and 22.77% respectively. Recovery percentage was also higher among male, and recovery was better among patient aged 60 or more (46.53% and 35.64% respectively).

Table 1. Demographic characteristics of CKD patients with COVID-19

Variable	Category	Number (%)
Age	<60 years	52 (51.48%)
	>60 years	49 (48.51%)
Gender	Male	74 (73.26%)
	Female	27 (26.73%)

Table 2. Outcome of the CKD patients with COVID-19

Characteristics	Number (%)
COVID-19 and CKD patient	101 (100%)
Patients requiring ICU admission	43 (42.57%)
Recovered patients	65 (64.35%)
Mortality	36 (35.64%)

Table 3. Clinical outcomes of CKD patients with COVID-19 according to demographic characteristics

Characteristics	Category (Gender)		Category (Age)	
	ICU admission	Male	32 (31.68%)	<60 years
	Female	11 (19.89%)	>60 years	12 (11.88%)
Recovery	Male	47 (46.53%)	<60 years	29 (28.71%)
	Female	18 (17.82%)	>60 years	36 (35.64%)
Mortality	Male	27 (26.73%)	<60 years	23 (22.77%)
	Female	9 (8.91%)	>60 years	13 (12.87%)

Most patients requiring ICU admission were less than or equal to 60 years as shown in Table 3.

DISCUSSION

This study was retrospective observational study conducted to find out the outcome of the patient with CKD under hemodialysis and PCR proven COVID-19. We showed that among these groups of patients the mortality was more than one third (35.64%) of the total cases. We found that among this group of patients, mortality and ICU admission were high although more than two thirds (64.35%) patients recovered. Different studies conducted worldwide among COVID 19 patients showed variable mortality rate ranging from 16.2 to 41%.⁸⁻¹² A study in Spain showed that the risk of patients with COVID 19 who are under hemodialysis is eight times higher than the general population. i.e. the mortality was 30% among the patients compared to 4.9% to the general population.¹³ Another study conducted with data from European Renal Association COVID-19 Database (ERACODA) including 737 patients showed male preponderance for mortality with mean age 67±14 years which was comparable to our study.¹⁰ A systematic review and meta-analysis showed high mortality among the patients with COVID-19 and CKD under dialysis than the patients with COVID-19 and CKD without dialysis.¹⁴

CONCLUSION

Requirement of ICU in CKD patients undergoing maintenance dialysis suffering from COVID-19 infection was 42.57% and mortality was 35.64%

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Conflict of Interest

None

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