

A Single-Center experience: SARS-Cov2 in End-stage Renal Disease and Kidney Transplant patients

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AIM

In this study we describe our experience in patients with ESRD and kidney transplant during the COVID 19 pandemic. With particular attention to the clinical course, laboratory, as well as the treatments used, prognosis and renal outcomes in patients with End stage renal disease (ESRD) and kidney transplant who were admitted and followed in our hospital diagnosed with SARS-CoV2 infection.

BACKGROUND

A new strain of coronavirus was first recognized in late 2019 in Wuhan, China and resulted in a worldwide pandemic by early 2020. This pandemic challenged health care systems worldwide. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), also known as coronavirus disease (COVID-19) resulted in a spectrum of illness ranging from asymptomatic, mild, and self-limiting to severe disease. People with comorbid disorders including chronic lung, heart or kidney disease, and diabetes suffered more severe disease. To this date, a specific treatment for COVID 19 disease is yet to be developed. As such there are no clear treatment guidelines or protocols for the management of patients in general and for hemodialysis and transplant patients in particular. The Centers for Disease Control and Prevention (CDC) lists patients with chronic kidney disease and immunocompromised patients as high risk for severe disease from SARS-CoV-2.

MATERIALS & METHODS

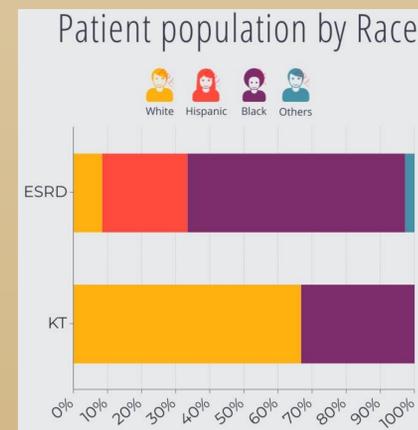
Our study is a single-center retrospective study. We conducted an observational, retrospective study in ESRD and Kidney transplant recipients hospitalized and diagnosed with COVID-19 disease at Advocate Christ Medical Center admitted between March 1 to May 31, 2020, a 3-month period. We describe our experience in patients with ESRD and kidney transplant during the COVID 19 pandemic. With particular attention to the clinical course, laboratory, radiological characteristics, as well as the treatments used, prognosis and renal outcomes in patients with End stage renal disease (ESRD) and kidney transplant who were admitted and followed in our hospital diagnosed with SARS-CoV2 infection.

RESULTS

From the aggregate total of patients diagnosed with SARS-COV 2 between March 1 to May 31, 2020, there were 34 patients with ESRD on RRT and 3 kidney transplants. The median age of our ESRD cohort was 63.5 years while the KT cohort was 69 years. For both patient populations they were predominantly male with 52.9% for ESRD and 66.7% for KT. With 64.7% of ESRD being composed of African Americans, while our KT patients were predominantly Caucasian at 66.7%. The average length of hospital stay was longer for KT patients at an average of 22 days. Incidence of in-hospital death was significantly higher in ESRD patients at 27.8% while we had no mortality for KT pts. For in patient mortality serum Na, K and BUN were not statistically significant from those who survived. D-dimer peak was significantly higher in mortality.

Table 5: Mortality and Inflammatory Markers among ESRD Patients

	Alive N=26	Expired N=10	P-Value
Comprehensive Metabolic Panel			
Serum Na Admission	135.0 (131.0-137.0)	133.0 (126.0-136.0)	0.16
Serum Na Peak	138.0 (135.0-140.0)	138.5 (137.0-139.0)	0.74
Serum K Admission	4.5 (3.8-4.9)	4.4 (4.0-5.0)	1.00
Serum K Peak	5.1 (4.6-5.6)	5.4 (4.9-6.1)	0.24
BUN Admission	53.0 (31.0-69.0)	49.5 (33.0-63.0)	0.92
BUN Peak	70.0 (57.0-86.0)	79.5 (53.0-114.0)	0.56
Inflammatory markers			
D-Dimer Admission	1.3 (0.9-2.7)	2.3 (1.6-4.5)	0.10
D-Dimer Peak	2.6 (1.6-5.3)	22.6 (9.5-26.9)	<0.01
Ferritin Admission	2068.5 (1392.0-3659.0)	1700.0 (1319.0-2484.0)	0.31
Ferritin Peak	4256.0 (1809.0-9345.0)	8346.0 (3716.0-19821.0)	0.11
LDH Admission	280.0 (247.0-391.0)	344.5 (250.0-497.0)	0.32
CRP Admission	12.5 (2.9-24.0)	11.5 (8.5-26.0)	0.58
CRP Peak	16.0 (8.9-35.0)	24.5 (17.0-37.0)	0.16
Procal Admission	1.9 (0.8-5.2)	2.6 (1.0-19.0)	0.51
IL6	39.0 (5.0-56.9)	16.0 (12.0-38.2)	1.00
COVID-19 Treatment Protocol used			
Azithromycin	12 (46.2%)	5 (50.0%)	0.84
Hydroxychloroquine	8 (30.8%)	3 (30.0%)	0.96
Methylprednisolone	9 (34.6%)	9 (90.0%)	<0.01
Prednisone	0 (0.0%)	0 (0.0%)	N/A
Remdesivir	0 (0.0%)	0 (0.0%)	N/A
Tocilizumab	1 (3.9%)	6 (60.0%)	<0.01
Convalescent Plasma	1 (3.9%)	2 (20.0%)	0.18
Other	1 (3.9%)	0 (0.0%)	1.00
None	6 (23.1%)	0 (0.0%)	0.10
Initial Therapeutic Anticoagulation			
Heparin gtt (reduced intensity)	4 (15.4%)	7 (70.0%)	<0.01
Heparin gtt (moderate intensity)	0 (0.0%)	0 (0.0%)	N/A
Heparin gtt (High intensity)	1 (3.9%)	1 (10.0%)	0.48
Enoxaparin	0 (0.0%)	0 (0.0%)	N/A
Agatrobain	0 (0.0%)	0 (0.0%)	N/A
Warfarin	2 (7.7%)	0 (0.0%)	1.00
DOAC	2 (7.7%)	0 (0.0%)	1.00
Other	0 (0.0%)	0 (0.0%)	N/A
None	17 (65.4%)	2 (20.0%)	0.01



DISCUSSION

The landscape of what we know regarding SARS-COV 2 infection and how it affects different subsets of patients with different comorbidities has been continuously evolving since day 1. Multiple reports and literature have been published, until now we are yet to fully elucidate disease epidemiology, characteristics, and effective treatments. As of writing there are multiple published data reporting several laboratory findings presumably associated with worse outcomes or in-hospital mortality, we aimed to investigate our data and our experience in ESRD and KT patients who were diagnosed with SARS-COV in the first three months 2 from when we started admitting patients in our institution

All in all we had 36 ESRD and 3 KT patients admitted to our institution between the months of March to May 2020, this was the first three months when we started seeing patients with SARS-CoV2 infection. Our treatment protocols set in place were at the bare minimum and consistently evolving as we learn more about the disease based on published data and guidance from the CDC.

Our patient population is predominantly African American, this could be in part influenced by our location. We are a community teaching hospital which serves an ethnically and racially diverse population in the south suburbs of Chicago.

We had 3 kidney transplant patients admitted during the early part of the year. The patients were predominantly male Caucasians. All three patients were on maintenance immunosuppressants namely: Prednisone, Mycophenolate Mofetil, Tacrolimus, Azathioprine, Leflunomide and Belatacept. All three patients did not need mechanical ventilation or renal replacement therapy during their admission.

Our study has several limitations, since this is a retrospective observational study and we had restricted our patient sample to include patients only from the initial three months. A follow up study to compare our initial patient cohort to the subsequent patient cohorts admitted beyond May 2020, In an effort to further understand the epidemiology and impact on ESRD and renal transplant recipients, and eventually help modify or develop guidelines for the optimal medical management of ESRD and kidney transplant patients with SARS-CoV-2 including strategies for reducing or modifying immunosuppression.

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