

COVID-19 infection outcome in African American Renal Transplant recipients: Detroit Medical Center experience

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ABSTRACT

Transplant recipients are vulnerable to infections including COVID-19, given their comorbidities and chronic immunosuppression.

In this study, all renal transplant recipients (RTR) with positive nasal swab for SARS-CoV2 seen consecutively between 03/01/2020 and 05/01/2020 at the Detroit Medical Center were included. Data on demographics, clinical presentation, laboratory findings, management and outcomes were collected.

Twenty five patients were included, all African American and deceased donor transplant recipients. Their median age was 56 years, 96% had hypertension, 52% had diabetes and 64% had pulmonary disease. The most common presenting symptom was dyspnea, followed by fever, cough and diarrhea. Multifocal opacities on initial chest x-ray were seen in 52% patients and 44% of patients had a initial oxygen saturation of $\leq 94\%$.

Immunosuppression management consisted of tacrolimus and prednisone. Following institutional guidelines, 48% received hydroxychloroquine and steroids while 32% received hydroxychloroquine alone. Four patients (16%) required transfer to the intensive care unit, one required intubation and one expired. At follow-up, treatment with mycophenolate was reintroduced based on resolution of symptoms and laboratory parameters. COVID-19 infected RTR in this cohort had low mortality of 4% (n=1). Despite multiple co-morbidities and chronic immunosuppression, our cohort of African American RTR had favorable outcome as compared to other reports on COVID-19 in RTR.

INTRODUCTION

As of July 26th 2020, Coronavirus disease (COVID-19) had affected over sixteen million individuals worldwide. The Centers for Disease Control (CDC) report a mortality of about 6% in the United States. By May 1, 2020 there were 46,072 patients with COVID-19 in the state of Michigan, with a case fatality rate of 9.4%, making Detroit one of the epicenters of the disease.

Patients over the age of 65 years and those with underlying conditions including chronic lung or heart disease are at risk for severe infection and high mortality. Likewise, patients with underlying chronic immunosuppression are also at risk for poor outcome.

Furthermore, disparities in COVID-19 outcomes among racial and ethnic minorities including African Americans are well recognized. There have been several published cases series in solid organ transplant recipients, including renal transplant, which confirm suboptimal outcome in this population. A case series from Belgium reports two deaths in a total of 22 patients with COVID-19.14

We present data on 25 SARS-CoV-2-infected African American renal transplant recipients (RTR) in a single center located in the City of Detroit, with excellent outcome.

METHODS

We included patients who had undergone kidney transplantation and were hospitalized at the Detroit Medical Center's (DMC) Harper University Hospital (HUH) with a positive SARS-CoV-2 RT-PCR test. Persons under investigation (PUI) with a negative test were not included. Eligibility for hospital admission was determined by emergency room physicians and criteria included hypotension, oxygen desaturation, fever, abnormal chest X-ray and evidence of acute kidney injury.

Data was collected from the patients' electronic medical record as a retrospective chart review. The time frame of testing was from 3/1/2020 through 5/1/2020, which includes the peak period of COVID-19 in the State of Michigan. Testing was done at LabCorp Laboratories or in-house at DMC University laboratories, and consisted solely of RT-PCR via specimens obtained from nasopharyngeal swabs.

RESULTS

Table 1A. Baseline demographics, n (%) or median (IQR)	All patients (n=25)	Table 1B: Baseline Comorbidities, n (%)	All patients (n=25)
Age, years	56 (47-66)	Hypertension	24 (96)
Male gender	14 (56)	Diabetes	13 (52)
African American	25 (100)	Cardiovascular disease	11 (44)
Time since transplant, months	78 (35-121)	Pulmonary disease	10 (40)
BMI, kg/m ²	29.5 (26-39)	Smoking history	8 (32)
Time on dialysis, months	47 (34-69)	Cancer	3 (12)

Table 2A. Clinical presentation, n (%) or median (IQR)	All patients (n=25)	Table 2B. Laboratory values, median (IQR)	All patients (n=25)
Shortness of breath	16 (64)	Tacrolimus trough, ng/mL	7.2 (6.5 – 8.7)
Cough	14 (56)	White blood cell count, per mm ³	5500 (4300-7000)
Diarrhea	14 (56)	Absolute lymphocyte count, per mm ³	900 (600-1100)
Fever (temperature > 38.4°C)	14 (56)	ANC/ALC	5.2 (4.0 – 7.3)
Fatigue	11 (44)	Serum creatinine, mg/dL	1.9 (1.5 – 3.2)
Chills	7 (28)	Serum ferritin, ng/mL	1275 (371 – 2293)
Myalgia/arthralgia	6 (24)	D-dimer, mg/L	2.0 (1.0 – 5.0)
Nasal congestion	3 (12)	C-reactive protein, mg/L	79 (48 – 157)
Nausea/vomiting	3 (12)		
Percent oxygen saturation	95 (90-98)		
Abnormal chest imaging	16 (64)		

Table 3. Management, n (%)	All patients (n=25)
Hydroxychloroquine + high dose corticosteroids	12 (48)
Hydroxychloroquine alone	8 (32)
High dose corticosteroids alone	1 (4)

Table 4. Outcome, n (%) or median (IQR)	All patients (n=25)
Acute kidney injury	16 (64)
Hospitalized	24 (96)
ICU admission	4 (16)
Readmission for COVID-19	2 (8)
Intubated	1 (4)
Died	1 (4)
Discharged (n=24 patients admitted)	23 (96)
Discharged with supplemental oxygen (n=24 patients admitted)	7 (29)
Length of stay, days, median (IQR)	5.5 (4 – 9.5)

DISCUSSION

- We report favorable outcome of COVID-19 in 25 deceased-donor kidney transplant recipients. Our cohort is composed entirely of African-American patients. Our 4% (n=1) mortality is markedly lower than what other renal transplant series across the world have reported.
- Majority of patients had radiographic findings of pneumonia (64%) and 44% had oxygen saturation at presentation of less than or equal to 94% qualifying as severe illness. 64% of cases required further measures such as oxygen supplementation or mechanical ventilation.
- Many of our patients presented with atypical symptoms such as diarrhea making the diagnosis and early treatment of COVID-19 challenging. This is in contrast to other case series in RTR where diarrhea was less frequent. Majority of the patients acquired the infection in the community, with just one patient manifesting symptoms several days into admission.
- This is the first published case series reporting outcomes in a group comprised solely of African American RTR with COVID-19. Throughout the US, African Americans are accounting for disproportionate COVID-19 associated death rates compared to other races and ethnicities. Remarkably, our cohort, despite the presence of comorbidities and risk factors, had an excellent outcome.
- Case reports in the general population have noted high levels of markers of inflammation with severe manifestation of COVID-19.18 Although our cohort included patients with elevated D-dimer, ferritin and CRP, it did not necessarily portend poor outcomes.
- Therapy with calcineurin inhibitors was maintained at target troughs based on our center protocol without tapering for severity of disease or acute kidney injury in order to attenuate COVID-19 related cytokine storm. Our observations suggest that the calcineurin pathway may play an important role in viral cytokine-mediated organ damage, and mitigation of hyperinflammation could modify the disease outcome.
- The use of steroids in our patients may have contributed to a good outcome.