

## **Coronavirus disease 2019 in HIV-infected Solid Organ Transplant Recipients: A Case Series**

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**Background:** Coronavirus disease 2019 (COVID-19) is associated with increased mortality and morbidity in immunosuppressed patients. Data on management and outcomes in HIV-infected solid organ transplant (SOT) recipients is lacking.

**Methods:** Single center, retrospective case series of HIV-infected SOT recipients who were diagnosed with COVID-19 by nasopharyngeal reverse transcriptase-polymerase chain reaction (RT-PCR) between April to August 2020. All patients had anti-retroviral therapy (ART) induced HIV viral load suppression at the time of diagnosis.

**Results:** Five consecutive cases were identified (table 1); 3 kidney, 1 heart and 1 liver transplant recipient. Three patients required hospitalization while 2 patients were managed outpatient. Median time to COVID-19 infection from transplant was 232 (range, 63-1502) days. Three were symptomatic with fever (100%), cough (67%), dyspnea (67%) and diarrhea (33%). An increase in inflammatory markers (C-reactive protein, ferritin, lactate dehydrogenase) was seen in all patients at the time of diagnosis, however only 3 (60%) required supplemental oxygen. Median time of follow up was 75 (range, 14-205) days. On diagnosis, first mycophenolate mofetil was discontinued or dose decreased by half. Calcineurin inhibitors and prednisone were maintained. In addition, investigational therapies including hydroxychloroquine, tocilizumab, remdesivir, dexamethasone were used in 2 (40%), 1 (20%), 1 (20%), 1 (20%), respectively (Table 2). One patient was managed with supportive care alone. All patients were on a protease inhibitor sparing antiretroviral regimen, which was continued. Overall, 4 (80%) survived, 1 (20%) died, 1 (20%) kidney transplant recipient had biopsy- proven acute T-cell mediated rejection 9 days after diagnosis with subsequent graft loss at follow up. Secondary infections were diagnosed with positive blood or respiratory cultures in 3 (60%). Death reported was due to septic shock from secondary infections. Three patients had a negative SARS-CoV-2 RT-PCR at a median of 25 (range, 20-56) days from diagnosis.

**Conclusions:** We report poor outcomes in this unique small cohort of HIV-infected SOT recipients. Balancing the decrease in immunosuppression and clinical monitoring to maintain graft function and avoid graft loss is extremely important. Further studies are needed to determine the cumulative effect of HIV infection and organ transplant status on the severity of COVID-19, optimal treatment and long term clinical and graft outcomes.

Table.1 Characteristics of HIV-infected SOT recipients with COVID-19	
Variable	All Patients N = 5 (%)
<b>Demographics</b>	
Age, median (range)	39 (27-62)
Gender, Male	3 (60%)
Race, African American	4 (80%)
<b>Comorbidities</b>	
Hypertension	4 (80%)
Diabetes Mellitus	1 (20%)
Overweight (BMI >25)	3 (60%)
<b>Transplanted organ</b>	
Kidney	3 (60%)
Liver	1 (20%)
Heart	1 (20%)
Time from transplant to diagnosis (days), median (range)	232 (63-1502)
<b>Exposure</b>	
Community	4 (80%)
Nosocomial	1 (20%)
Laboratory values at the time of diagnosis, median (range)	
White blood cells, cells/ $\mu$ L	6 (4.8-15.8)
Creatinine, mg/dl	1.8 (1.4 – 5.6)
C-reactive protein, mg/dL*	3.9 (1 - 34.5)
Ferritin, ng/mL*	1380 (867 – 6106)
Lactate dehydrogenase, U/L	646 (321- 758)
CD4 count, cells/ $\mu$ L, at baseline	740 (51 – 1306)
CD4 count, cells/ $\mu$ L, on diagnosis	83.81 (36.2 – 200)
CD4 count, cells/ $\mu$ L, at follow-up	405 (286 – 778)
Radiographic findings	
Abnormal Chest-Xray; Interstitial opacities	3 (60%)
Data presented as absolute number (percentage), unless specified otherwise. Abbreviations: BMI, body mass index;	

Table.2 Management of HIV-infected SOT recipients with COVID-19	
<b>Management</b>	
Maintenance Immunosuppression	
Tacrolimus	4 (80%)
Sirrolimus	1 (20%)
Mycophenolate mofetil	5 (100%)
Prednisone	4 (80%)
<b>ART Regimen</b>	
Abacavir + Dolutegravir + Lamivudine	2 (40 %)
Emtricitabine + TAF + Dolutegravir	2 (40 %)
Emtricitabine + TAF + Dolutegravir + Ibalizumab	1 (20%)
<b>Immunosuppression</b>	
Reduction in immunosuppression	5 (100%)
Mycophenolate mofetil held	4 (80%)
Mycophenolate mofetil dose reduction	1 (20%)
<b>Investigational treatment given</b>	
Hydroxychloroquine	2 (40 %)
Tocilizumab	1 (20%)
Remdesivir	1 (20%)
Dexamethasone	1 (20%)
<b>Outcomes</b>	
Overall Survival	4 (80%)
Overall Mortality	1 (20%)
Graft loss	2 (40 %)
Secondary infections	3 (60%)
Time to SARS-CoV-2 PCR negativity (days), median (range), (n=3)	25 (20-56)
Data presented as absolute number (percentage), unless specified otherwise. Abbreviations: ART, antiretroviral therapy; TAF, tenofovir alafenamide	