Long-term (2-year) outcomes and complications of COVID-19 in solid organ transplant (SOT) recipients

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BACKGROUND

- The long-term complications of COVID-19 in the general population include mortality, re-infection, secondary infection, persistent organ dysfunction, and symptoms of long-COVID. The prevalence of these outcomes and impact on graft function in SOT remain uncertain.
- We aim to describe these complications in a large series of SOT with COVID-19 with 2 years of long-term follow-up.

METHODS

- We retrospectively studied all adult (age>18) SOT from a single center hospitalized with SARS-CoV-2 diagnosed by nasopharyngeal swab between 3/10-5/30/2020. Patients with early mortality (≤ 28 days) were excluded.
- Outcomes including mortality, allograft rejection (biopsy-proven), allograft failure, secondary infections, COVID-19 re-infections, post-COVID complications (oxygen requirement, chronic renal or cardiac dysfunction), and symptoms of long-COVID (in accordance with WHO criteria: ≥ 3 months post-infection for ≥ 2 months without alternative explanation) were analyzed. Re-infections were characterized by severity and likely variant based on local variant predominance.

RESULTS

Table 1. Demographics (n = 94)

Age, median (IQR)	57 (48.25 – 68)
Male	62 (66.0%)
Race	
White/Caucasian	39 (41.5%)
Black/African-American	29 (30.9%)
Other	26 (27.7%)
Hispanic Ethnicity	40 (42.6%)
HTN	70 (74.5%)
DM	51 (54.3%)
Transplanted Organ	
Kidney	46 (48.9%)
Heart +/- Kidney	17 (18.1%)
Liver +/- Kidney	12 (12.8%)
Pancreas +/- Kidney	3 (3.19%)
Lung	16 (17.0%)
Years from transplant to diagnosis of COVID-19, median (IQR)	5.65 (1.96 – 10.0)
Days of follow-up from diagnosis of COVID-19, median (IQR)	751 (742 – 760)

- 117 SOT recipients were hospitalized with COVID-19 in the study period. 94 survived the first 28 days. 9 (9.57%) died within 1 year of infection and 14 (14.9%) within 2 years.
- 21 (22.3%) had ≥ 1 episode of allograft rejection and 21 (22.3%) had allograft failure.
- 43 (45.7%) had secondary infections and 18 (19.1%) with multi-drug resistant organisms.
- 32 (34.0%) developed new chronic kidney disease or end-stage renal disease, 25 (26.6%) had new cardiovascular disease, and 8 (8.51%) had a prolonged oxygen requirement following infection.
- Of reported long-COVID symptoms, fatigue (26, 27.7%), dyspnea (18, 19.1%), and cough (11, 11.7%) predominated with 25 (26.6%) having ≥ 1 symptom.

Fig 1. Mortality (Day 28 - 2 years)

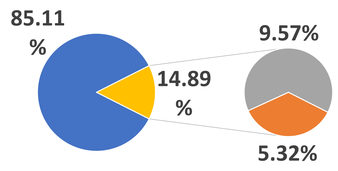


Fig 2. Allograft Function

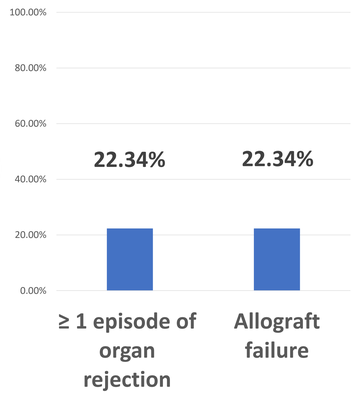
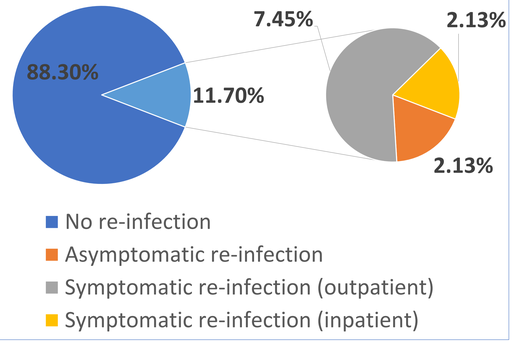


Table 2. Long-term outcomes and complications of COVID-19 (n = 94)

Secondary Infections	43 (45.7%)
Multidrug resistant organisms (MDRO)	18 (19.1%)
Cytomegalovirus (CMV)	12 (12.8%)
Aspergillus	4 (4.26%)
Clostridium difficile	3 (3.19%)
Candida spp.	2 (2.13%)
Non-tuberculous mycobacteria	2 (2.13%)
	8 (8.51%)
Prolonged oxygen requirement	32 (34.0%)
New renal dysfunction (CKD or ESRD/HD)	11 (11.7%)
New cardiovascular dysfunction	6 (6.38%)
DVT/PE	5 (5.32%)
Arrhythmia	4 (4.26%)
CVA	
CHF	
Long-COVID symptoms	
Fatigue	26 (27.7%)
Dyspnea	18 (19.1%)
Cough	11 (11.7%)
Psychiatric	5 (5.32%)
Taste/Smell	0 (0%)

- 11 (11.7%) were re-infected with COVID-19 at a median of 603 (389-642) days following initial infection, of whom 2 (2.13%) were hospitalized and 0 died.

Fig 3. COVID-19 Re-infection



DISCUSSION

- In this large cohort of SOT recipients hospitalized during the first wave of the COVID-19 pandemic, long-term 2-year follow-up showed high rates of mortality, allograft rejection, allograft failure, secondary infection, organ dysfunction, and symptoms consistent with long-COVID. Ongoing study of the impact of these complications will be crucial to improving outcomes in SOT recipients.

DISCLOSURES

- Daniel Burack – no disclosures
- Marcus Pereira – Merck, Hologic, Moderna, Shire/Takeda (Grant/Research) Takeda, Union Therapeutics, Rebiotix, CliRNT (Consultant)
- Elizabeth Verna – Salix (Grant/Research)