Characteristics and Outcomes of Patients with SARS-CoV-2 Reinfections Requiring Treatment in a COVID-19 Ambulatory Treatment Program

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Background

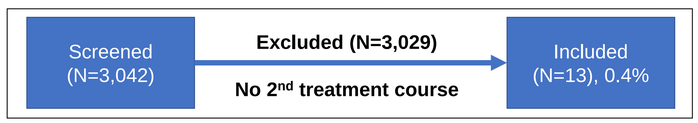
- In response to the COVID-19 pandemic, Montefiore Medical Center (MMC) in Bronx, NY established an ambulatory program to provide COVID-19 treatments, including monoclonal antibodies (mAbs) and oral antivirals, to patients with mild to moderate illness
- Several waves of different COVID-19 variants have circulated in the area throughout the pandemic, resulting in patients with reinfections and need for retreatment[1,2]

Objective

- To identify clinical characteristics and outcomes in patients with repeated COVID-19 infections and who received retreatments with mAbs or oral antivirals

Methods

- **Study Design**: Retrospective, single hospital system, descriptive study



- **Inclusion**: Patients identified via electronic health record system query between December 1st, 2020, and April 28th, 2022, who received COVID-19 treatment on >1 occasion at MMC
  - COVID-19 treatment is defined as treatment with mAbs or oral antivirals (i.e., nirmatrelvir-ritonavir, molnupiravir) via emergency use authorization
- **Data Collection**
  - Demographics
  - Risk factors for progression to severe illness per Centers for Disease Control guidance[3]
  - Name and date of COVID-19 treatments received
  - Vaccination status at time of repeated treatment
  - Clinical outcomes by day 30: emergency department (ED) presentation or hospital admission following each treatment
- **Statistical Analysis:**
  - Descriptive statistics
    - Categorical data: frequency (%)
    - Continuous data: median (IQR)

Results

Table 1. Baseline Characteristics

Baseline Characteristics*	Patients (N=13)
Days between first and second COVID-19 episode treatments, median (IQR)	298 (157)
Age in years, median (IQR)	50 (28)
Male	5 (38)
Ethnicity	
Unknown	2 (15)
Hispanic/Latino	4 (31)
Non-Hispanic/Latino	7 (54)
Race	
White	4 (31)
Black	3 (23)
Asian	1 (8)
Other	5 (38)
Risk factors for progression, median (IQR)	2 (3)
Age ≥ 65 years	3 (23)
BMI ≥ 30 kg/m^2	3 (23)
Diabetes	5 (38)
Cardiovascular disease%	7 (54)
Pulmonary disease#	2 (15)
Chronic kidney disease	4 (31)
Immunocompromised	8 (62)
Active treatment for solid tumor or hematologic malignancies	2 (15)
Receipt of solid organ transplantation and on immunosuppressive therapy	5 (38)
Receipt of CAR-T cell therapy or bone marrow transplant	1 (8)
Primary immunodeficiency	1 (8)
Vaccination status at time of second COVID-19 episode	
Unvaccinated	2 (15)
At least one dose received	11 (85)
Fully vaccinated	5 (38)
Boosted	5 (38)
Same vaccine administered for all doses	11 (100)
Vaccines	
Pfizer	7 (54)
Moderna	3 (23)
Johnson & Johnson	1 (8)

*All characteristics expressed as "n, (%)" unless otherwise stated above

%Cardiovascular disease includes hypertension, coronary artery disease, congestive heart failure, cardiomyopathy, or congenital heart disease

#Pulmonary disease includes moderate-to-severe asthma on daily medications, chronic obstructive pulmonary disease/emphysema, pulmonary hypertension, cystic fibrosis, or interstitial lung disease

Figure 1. COVID-19 Treatments for Repeat Infections

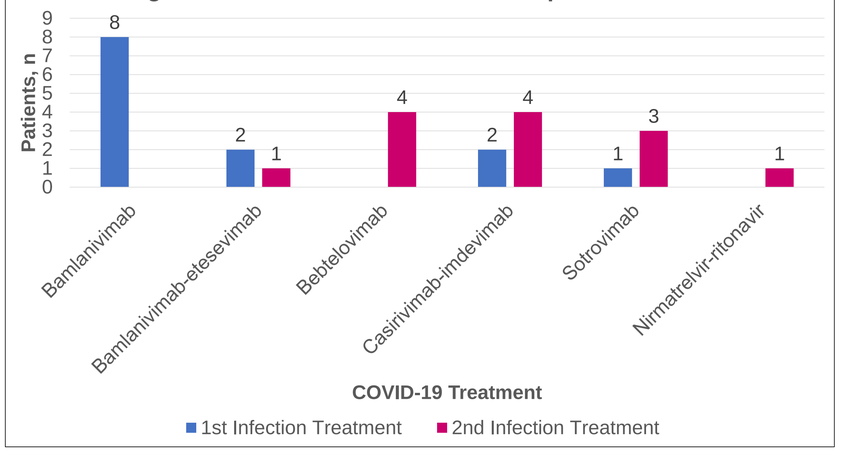


Table 2. Outcomes of Patients by Day 30 Following 2nd Episode Treatment

	Patients (N=13)
No repeat encounter, n (%)	9 (69%)
Emergency department visit or hospitalization, n (%)	4 (31%)
Due to COVID-19-related symptoms, n (%)	3 (75%)
With risk factors for progression, n (% of ED visits or hospitalizations)	2 (50%)
Two risk factors for progression, n (% of those with risk factors)	2 (100%)
Deaths, n (%)	0 (0%)

Discussion

- Patients with infections requiring retreatment often had multiple risk factors for progression
- Reinfections requiring retreatment occurred despite most patients receiving ≥1 vaccine dose at time of 2nd infection
- No deaths within 30 days of 2nd treatment course were identified
- Limitations: sample may not include patients who received treatment at other medical facilities; changes in prevalent strains and variants with different virulence over study period

Conclusions

- Among screened patients who received treatment for an initial COVID-19 infection, few patients (0.4%) were identified with a 2nd COVID-19 infection which required retreatment
- Patients with risk factors for disease progression may also be at increased risk for reinfection, especially the immunocompromised

References

1. Hoogenboom WS, et al. *Lancet Reg Health Am*. 2021 Nov;3:100041.
2. Zhong X, et al. *Ann Epidemiol*. 2022 Jun;70:45-52.
3. https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html