Tocilizumab: A Friend or A Foe in COVID-19 Management?

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Background

- The emergence of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has led to many proposed treatments for the novel coronavirus disease 2019 (COVID-19) induced cytokine release syndrome (CRS)
- We aimed to investigate the treatment response of tocilizumab (TZB), an Interleukin-6 (IL-6) inhibitor, for patients with severe or critical COVID-19 pneumonia

Methods

- A retrospective chart review in COVID-19 patients was conducted from 03/18/20 - 05/20/20
- Patients with PCR confirmed COVID-19 who received TZB were included
- Variables included dose and timing of TZB, trend of acute phase reactants, time to improved oxygenation and defervescence, 30-day mortality, and hospital/intensive care unit (ICU) length of stay (LOS)
- Descriptive statistics were used to analyze the data
- A standardized dose of 400 mg was used in all patients, and only two out of twelve patients received a second dose

Results

Table I: Patient Characteristics

Patient Characteristic	N = 12
Age, years (median)	51.5 (IQR = 34-87)
% of males	27%
Mean body weight (kg)	109.1 (SD = 33.8)
Average day of illness at time of TZB administration	6.6
Median IL-6 baseline levels	38.3 (IQR < 5 – 96.22)
Average CRS score at the time of TZB administration	3.3
Non-invasive and invasive supplemental oxygen	100%
Mechanical ventilation	58%
Additional COVID-19 therapies	92%
Number of patients receiving second dose of TZB	10% (n=2)
Average time to defervescence (n=6)	7.3 hours

Results

Table II: Patient Characteristics After TZB Administration

Characteristics after TZB administration	N = 12
Mechanically ventilated patients that showed a decrease in oxygen requirements after 24 hours	71%
Patients not requiring mechanical ventilation that showed a decrease in oxygen requirements after 24 hours	20%
Median ICU days	17.5 (IQR = 3-39)
Median LOS days	21.5 (IQR = 8-46)
Patient that became neutropenic (ANC<500)	0%
Patients that showed a sustained decrease in C-Reactive Protein	100%
30-day mortality	0-9%

Figure A: Infectious Complications After TZB Administration
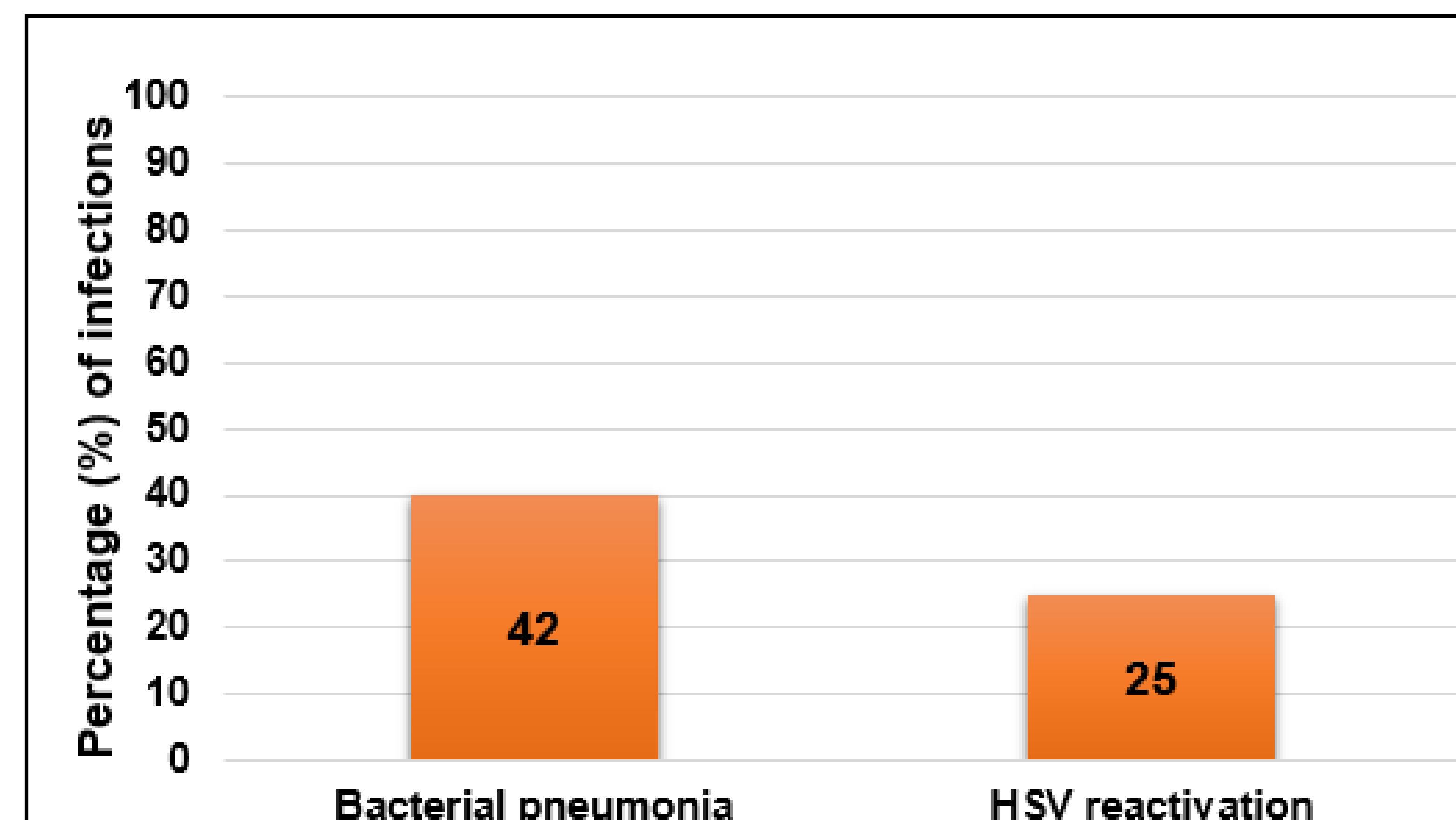
Study Limitations

- This is a retrospective chart review and single center study with a small cohort of patients - hence this data should be interpreted cautiously
- The majority of patients (92%) received concurrent COVID-19 therapies including hydroxychloroquine, convalescent plasma and remdesivir, and 100% of patients received antimicrobial therapy

Conclusions

- Our findings suggest that TZB may have a role in mechanically ventilated patients in decreasing oxygen requirement; however, larger randomized studies are needed to understand which patients would benefit the most
- Other observational, single center studies have shown similar results
- Our study also highlights secondary infections and Herpes Simplex Virus (HSV) reactivation in TZB patients
- Culture data was available for four out of the 5 confirmed bacterial pneumonia cases, and in two out of four (50%) *Staphylococcus aureus* and *Klebsiella aerogenes* were isolated
- No bacteremia or invasive fungal infections were documented
- Only six out of the 12 patients were febrile (50%), and their average time to defervescence was 7.3 hours
- Eleven out of 12 patients were discharged (i.e., one patient passed after opting for comfort measures only), and we were able to track ten out of the eleven discharged patients. Given this, the 30-day mortality was deemed to be 0-9%

References

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