

# Secondary Infections in Covid-19 Patients Receiving Tocilizumab in a Community Hospital

Usiak, Shauna, MPH, CIC, DiFilippo, Laurie, RN, BSN, Frattellone, Meredith, RN, BSN, CIC, Kincart, Mary, MS, RN, BSN, Kerr, Christine, MD, AAHIVS

## INTRODUCTION

- Secondary bacterial and fungal infections in patients with pandemic strains of Influenza have been well documented..
- Little is known about the development of secondary bacterial or fungal infections in patients with Covid-19.
- Additionally, Covid-19 patients receiving tocilizumab as treatment may be at higher risk for developing a secondary infection due to theoretical risk of immunosuppression.

## OBJECTIVE

- A retrospective study looking at Covid-19 positive patients who received tocilizumab treatment and incidence of secondary infections in that population

## METHODS

- A retrospective analysis of all Covid-19 positive patients admitted to a 128 bed community hospital in Westchester County, NY from March 1 – September 15, 2020
- The data was analyzed to determine incidence of secondary infections based on positive bacterial/fungal cultures in Covid-19 positive patients during their initial admission or subsequent admission for Covid-19 related illness and further stratified based on receipt of tocilizumab.
- Four patients in the non-tocilizumab group had secondary infections that occurred shortly after discharge were included in this study
- Two patients who received tocilizumab had secondary infections prior to receiving the tocilizumab and were not included in the culture positive tocilizumab group
- One patient was still admitted at time of this publication; this patient was excluded from sections of the analysis

## RESULTS

Of the 513 Covid-19 positive patients reviewed, 98 (19.1%) had positive bacterial/fungal cultures following their first positive Covid-19 test.

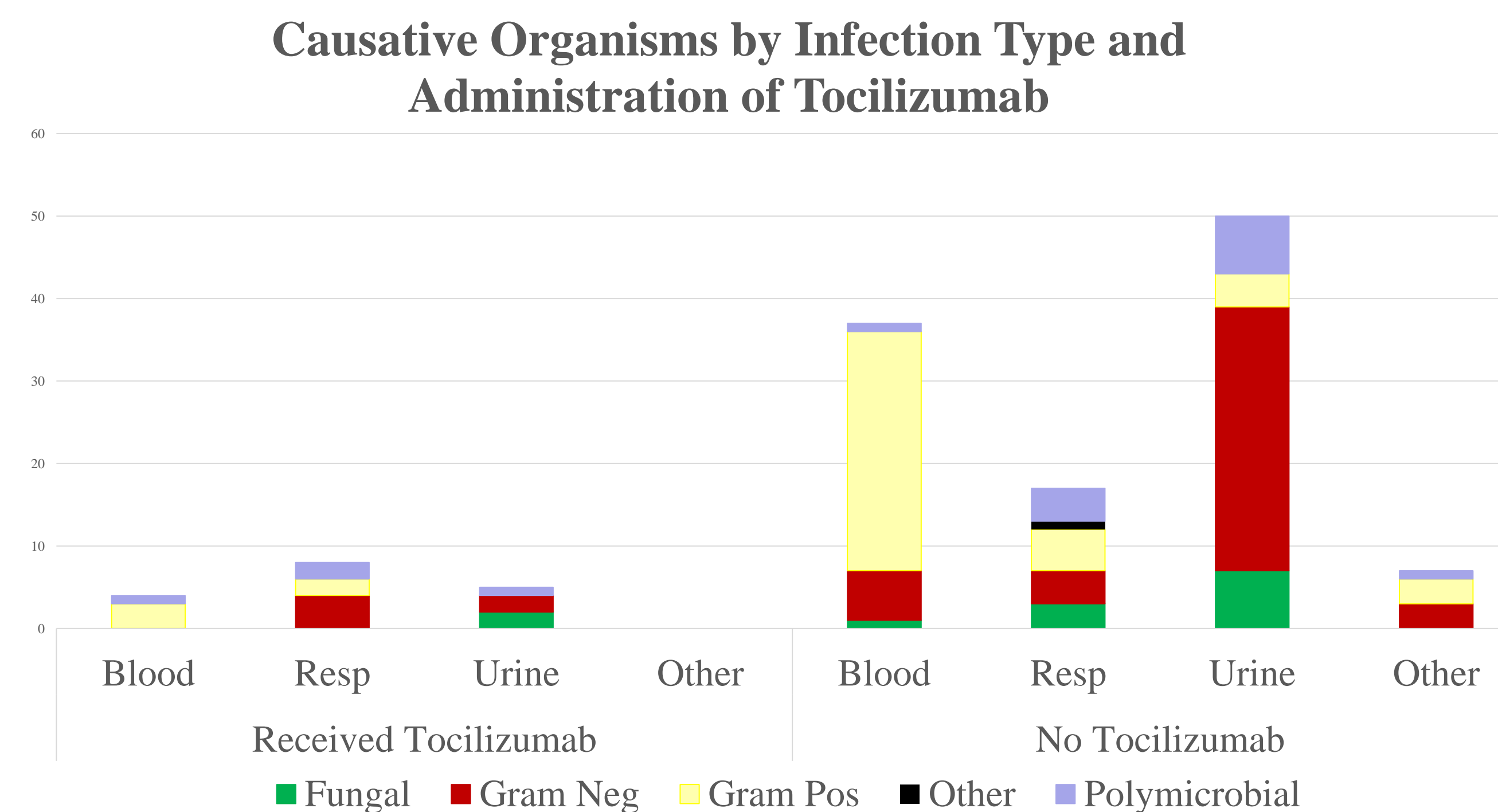
Out of 513 positive Covid-19 patients, 43 received tocilizumab. Of those 43, 10 patients (23.2%) developed at least one secondary infection. This was not statistically significant ( $p=0.47$ ). (Figure 1) Of note, 5 patients received 2 doses of Tocilizumab, only 1 had a positive culture.

Figure 1

	Received Tocilizumab	No Tocilizumab	Total
Positive Culture	10	88	98
No Cultures/Culture Neg	33	382	415
Total	43	470	513

Of the secondary infections developed, respiratory infections 8 were the most common (80%), followed by 5 urinary tract infections (50%), and lastly 4 bloodstream infections (40%). (Figure 2) Average onset of positive culture was 12 days after administration of tocilizumab (Range: 3-28). Compared to those who did not receive tocilizumab, 88 patient. (18.7%) developed 111 secondary infections. Most common infections in this group were 51 urinary tract infections (57.3%), followed by 37 bloodstream infections (41.5%), 15 respiratory infections (16.8%), and lastly all (8) other infections (10.1%).

Figure 2



Patients in both groups (received tocilizumab vs not) were most likely to have secondary infections with gram negative bacteria, 35.3% vs 40.5%. (Figure 3) None of the infections in the Tocilizumab group were caused by multi-drug resistant organisms vs. 9 in the other group.

Figure 3

	Received Tocilizumab	No Tocilizumab
Fungal	2	11
Gram Neg	6	45
Gram Pos	5	39
Other	0	1
Polymicrobial	4	15

## RESULTS

The top 5 causative organisms for each group are detailed below (Figure 4) as are patient demographics for each. (Figure 5)

Figure 4

Top 5 Causative Organisms of Secondary Infections			
Received Tocilizumab		No Tocilizumab	
Staphylococcus aureus	5	Escherichia coli	30
Candida krusei	2	Staphylococcus coagulase negative	12
Citrobacter koseri	2	Candida albicans	11
Enterobacter aerogenes	2	Staphylococcus aureus	11
Pseudomonas aeruginosa	2	Proteus mirabilis	10
Unspeciated yeast	2	Pseudomonas aeruginosa	10

Figure 5

Patient Demographics		
	Received Tocilizumab	No Tocilizumab
Average Age	60	65
Gender (% Male)	72%	57%
Required Ventilator	58%	14%
Avg Days on Vent	14 days	12 days
Avg Length of Stay	21 days	9 days
Mortality	33%	25%

## LIMITATIONS

- Small dataset, particularly of patients receiving tocilizumab.
- Definition of infection based solely on positive microbiology cultures and did not include chart review.
- Unable to determine steroid use (either at this baseline or acutely) from this dataset.
- Unable to identify community or nursing home origin for patients.
- No data on comorbidities, which may be a confounder.

## CONCLUSIONS

- This small retrospective study found that the incidence of bacterial or fungal co-infection for Covid-19 positive patients was high but did not find receipt of tocilizumab was significantly associated with secondary infections.
- Tocilizumab group had a higher incidence of positive respiratory specimens. However a higher proportion of these patients were placed on ventilators.
- This suggests areas for future study and further investigation as hospitals consider use of immunomodulatory therapies in the treatment of Covid-19.