A Retrospective Assessment of the Effects of Baricitinib and Tocilizumab on COVID-19 Patients requiring High Flow Oxygen

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OBJECTIVE

- To identify outcomes in hospitalized patients with COVID-19 pneumonia treated with baricitinib versus tocilizumab in addition to standard of care.

BACKGROUND

- Severe COVID-19 pneumonia is associated with a hyperinflammatory state which is why there is a large interest in using immune modulators for treatment.
- Immune modulators help hinder the signaling pathway of cytokines known to cause inflammation in severe COVID-19.
- Baricitinib and tocilizumab are two immune modulators that are indicated for patients with COVID-19 who require at least high flow oxygen or rapid oxygen escalation.
- While baricitinib and tocilizumab are now recommended in persons with high oxygen requirements, comparisons between the use of these two immune modulators for COVID treatment are not available.

METHODS

- Retrospective chart review of adult patients admitted to Stony Brook University Hospital between April 2020 and April 2021 with high flow oxygen requirements or rapid increase requirement of oxygen due to severe COVID-19 pneumonia.
- Patients received remdesivir, dexamethasone, **and either** tocilizumab or baricitinib for the treatment of COVID-19
- Primary endpoint: time to reduction of highest oxygen requirement 14 days after immune modulator therapy was administered or hospital discharge, whichever came first.
- Secondary endpoints: length of hospital stay, 28-day mortality, serious adverse events.
- SPSS was used for statistical analysis, utilizing Student T-test and Chi-square tests.

RESULTS

- 132 patients with COVID-19 received immune modulators (1 patient excluded due to receiving both baricitinib and tocilizumab).
- Women more likely to have received baricitinib than tocilizumab (41 vs. 32, p=0.031)
- Oxygen requirements at the initiation of tocilizumab or baricitinib were relatively similar (mean ± SD) 5.9 ± 0.718 vs. 5.84 ± 0.578, p=0.722.

Table 1. Patient Demographics, Labs, Comorbidities, and Oxygen Requirements

	Baricitinib (n=73)	Tocilizumab (n=58)	p-value
Male (number of subjects)	32	38	0.013
Age (Mean ± SD)	64.58 ±14.26 yo	61.95 ±13.10 yo	0.280
BMI (Mean ± SD)	32.77 ± 8.25	31.57 ± 5.96	0.358
eGFR (Mean ± SD)	80.75 ± 21.62	83.72 ± 25.87	0.475
AST (Mean ± SD)	57.33 ± 35.10 IU/L	54.62 ± 33.49 IU/L	0.655
ALT (Mean ± SD)	48.40 ± 38.84 IU/L	41.33 ± 23.59 IU/L	0.255
WBC (Mean ± SD)	7.77 ± 3.40 K/uL	7.56 ± 4.25 K/uL	0.777
Ferritin (Mean ± SD)	909.90 ± 646.80 ng/mL	1331.81 ± 1156.97 ng/mL	0.009
ESR (Mean ± SD)	58.44 ± 23.27 mm/hr	56.40 ± 29.97 mm/hr	0.661
CRP (Mean ± SD)	11.87 ± 9.64 mg/dL	13.72 ± 9.06 mg/dL	0.265
D-dimer (Mean ± SD)	1738.52 ± 7120.34 ng/mL	1363.74 ± 5542.832 ng/mL	0.743
Duration of fevers (Mean ± SD)	6.04 ± 11.32 days	3.6 ± 4.07 days	0.040
Charlson Comorbidity Index (Mean ± SD)	2.64 ± 1.84	2.53 ± 2.23	0.459
O2 requirement at Immune modulator initiation (WHO Ordinal Scale)	5.84 ± 0.58 (Mean ± SD)	5.90 ± 0.718 (Mean ± SD)	0.722

Table 2. Outcomes and Adverse Events

		Baricitinib	Tocilizumab	p-value
Outcomes	Mean time to O2 downtitration (WHO Ordinal Scale) at 14 days/hospital discharge	5.70 ± 2.57	6.07 ± 2.70	0.278
	Mean length of hospital stay	24.36 ± 36.16 days	25.83 ±27.21 days	0.890
	Hospital Mortality (# of cases)	24	16	0.514
Adverse Events	New Infections (PNA, UTI) (#cases)	19	14	0.842
	Other adverse events [AKI, transaminitis, VTE, cardiac events](#patients)	48	32	0.279
	Acute kidney Injury (#cases)	15	7	0.243
	Transaminitis (#cases)	30	15	0.095
	Venous thromboembolism (#cases)	15	11	0.822
	Cardiac event (#cases)	3	2	1.000

LIMITATIONS

- Retrospective, single center study
- Choice of baricitinib vs. tocilizumab was based on clinician preference, may have allowed selection bias
- Persons with infections from the currently circulating variants (Omicron) were not represented. Results may not be extrapolated to such patients

CONCLUSIONS

- Similar outcomes for oxygen requirements, hospital length of stay, and mortality were seen when baricitinib and tocilizumab were given in conjunction with remdesivir and steroids for severe COVID-19 pneumonia.
- No statistical difference was noted among adverse events including new infections, AKI, venous thromboembolism, transaminitis, and cardiac events.
- A trend towards higher number of adverse events and mortality was seen, though this was not statistically significant.

FUTURE DIRECTIONS

- Data analysis after April 2021 to assess impact during delta and omicron variant surges.

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