Baricitinib versus Tocilizumab for Hospitalized Adults with Severe COVID-19 in a Community Health System: A Retrospective Cohort

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Background

- In patients diagnosed with coronavirus disease 2019 (COVID-19) requiring hospitalization, significant hyperinflammatory processes result from dysregulated immune responses.
- Baricitinib and tocilizumab earned FDA Emergency Use Authorizations (EUA) for the treatment of COVID-19. Both agents aim to disrupt the activation of downstream signaling molecules and pro-inflammatory mediators.
- Despite evidences supporting the benefits of baricitinib and tocilizumab in the general population[1,2], evidence regarding a direct comparison between both agents is lacking, and provider hesitation may lead to poorer outcomes in a condition that already presents unfamiliarity.

Study Objective

- To compare the effects of baricitinib and tocilizumab on disease progression in patients with COVID-19

Outcomes

Primary Outcome
- In-hospital mortality

Secondary Outcomes
- Improvement in CRP levels
- Hospital LOS (days)
- ICU LOS (days)
- Readmission due to respiratory-related causes

Study Design

- Single-center, retrospective chart review of patients admitted with COVID-19 from July 2020 – December 2021

Methods

Inclusion Criteria
- Patients > 18 years of age
- Laboratory-confirmed SARS-CoV-2 infection (as determined by PCR)
- Evidence of lower respiratory tract infection at the same time of enrollment based on one of the following:
  - Radiographic infiltrates by imaging study
  - SpO2 < 94% on room air
  - Requiring supplemental oxygen, mechanical ventilation or ECMO
- Administration of dexamethasone 6 mg daily or steroid equivalent
- Administration of remdesivir $\geq$ 5 days

Exclusion Criteria
- Pregnancy or breast feeding
- Impaired renal function defined as eGFR < 15 ml/min or requiring HD during admission

Statistical Analysis
- Baseline characteristics were analyzed using descriptive statistics
- Continuous variables based on distribution: two-sample t test or Wilcoxon rank sum test
- Categorical variables: chi-square test or Fisher's exact test

Results

Baseline Characteristics
- A total of 175 patients were included in the baricitinib group while 239 patients were included in the tocilizumab group.
- Both groups were similar in age (59.9$\pm$15.0 vs. 61.2$\pm$13.9, p=0.39), BMI (30.9 [27.3, 36.4] vs. 31.4 [27.5, 36.5], p=0.35), and comorbidities
- Tocilizumab group had greater females (45% vs. 34%, p=0.036), longer LOS (median [IQR]: 15 [10,23] vs. 13 [9,20], p=0.039), more additional source of infection (25% vs. 16%, p=0.043), more positive microbiology from blood (10% vs. 3%, p=0.009).

Primary Outcome
- After adjustment of sex and CRP level, the odds of death in tocilizumab was 86% higher than that of baricitinib group [OR 1.86, 95%CI 1.17-2.96, p=0.009].

Secondary Outcomes

	Baricitinib (n=175)	Tocilizumab (n=239)	p-value
CRP level at discharge or death	1.8 [0.58, 5.8]	0.84 [0.18, 6.1]	**0.044**
Hospital length of stay (days)	13.0 [9.0, 20.0]	15.0 [10.0, 23.0]	**0.039**
ICU length of stay (days)	0.00 [0.00, 6.0]	3.5 [0.00, 12.0]	**<0.001**
Readmission within 30 days	6 (4.3)	11 (5.1)	0.72
Readmission within 60 days	6 (4.3)	17 (7.8)	0.18
Progressed to mechanical ventilation, no (%)	31 (22.0)	77 (35.5)	**0.007**
Organ support (vasopressors, ECMO), no (%)	41 (29.1)	102 (47.0)	**<0.001**

Conclusion

- Our findings suggest that baricitinib may have lower rates of in-hospital mortality, but higher levels of CRP when compared to tocilizumab.
- Tocilizumab was also found to have higher needs for organ support and mechanical ventilation.
- With no way to differentiate between a delta-variant infected patient and an omicron-variant infected patient, the possibility of the severity of illness associated with each variant may have played a role in the outcomes.
- Larger randomized studies comparing the two agents directly would provide further insight on the benefits of utilizing one agent versus the other.

References

1. Marconi VC, Ramanan AV, de Bono S, et al. Efficacy and safety of baricitinib for the treatment of hospitalised adults with COVID-19 (COV-BARRIER): a randomised, double-blind, parallel-group, placebo-controlled phase 3 trial. Lancet Respir Med. doi:10.1016/s2213-2600(21)00331-3
2. Salama C, Han J, Yau L, et al. Tocilizumab in Patients Hospitalized with Covid-19 Pneumonia. N Engl J Med. 2021;384(1):20-30. doi:10.1056/nejmoa2030340

Disclosure

The investigators declare no conflicts of interest.