#HTA17

Cost-effectiveness analysis of tocilizumab for the treatment of Coronavirus Disease 2019 (COVID-19) in hospitalised patients on corticosteroids, requiring supplemental oxygen or mechanical ventilation and having c-reactive protein (CRP) level ≥ 75mg/L from the Italian NHS perspective

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Background

By the middle of October, 2022, SARS-CoV-2 had infected approximately 621 million individuals and caused 6.5 million deaths worldwide[1]. While most infections are either asymptomatic or only lead to mild COVID-19, some patients develop respiratory failure. Evidence shows hypoxic respiratory failure in COVID-19 patients is associated with systemic inflammation including the release of pro-inflammatory cytokines such as interleukin 1 and 6 and tumor necrosis factor α, and elevated concentrations of D-dimer, ferritin and C-reactive protein [2, 3].

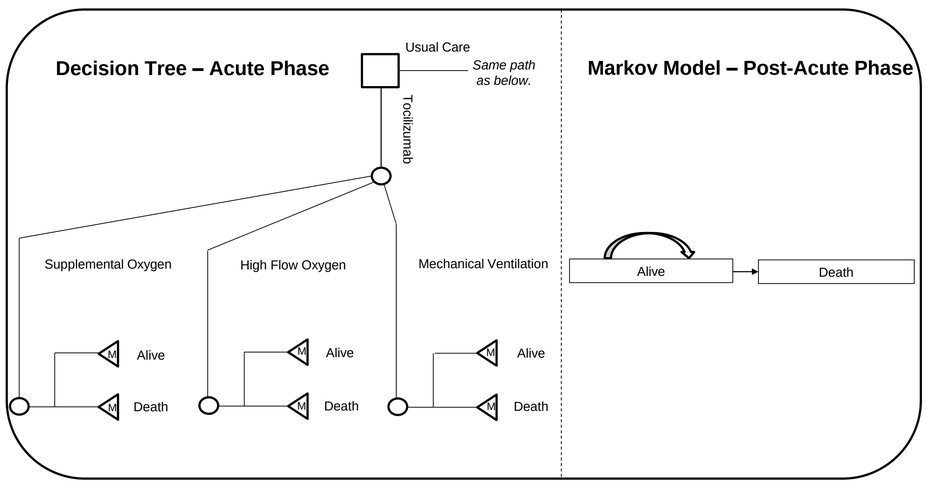
Tocilizumab is a recombinant humanized anti-interleukin 6 receptor monoclonal antibody that inhibits the binding of interleukin 6 to membrane and soluble interleukin-6 receptors, thus, blocking interleukin 6 signaling and reducing inflammation [4]. Results from RECOVERY, a large randomized, open-label platform trial, show that tocilizumab improved survival and other clinical outcomes in patients with COVid-19 who had hypoxia and systemic inflammation in comparison to usual care [4].

Objectives and Methods

The current study assesses the cost-effectiveness of tocilizumab plus usual care versus usual care alone for the treatment of COVID-19 in hospitalized patients on corticosteroids, requiring supplemental oxygen or mechanical ventilation and having a CRP level of ≥ 75mg/L. It utilizes a decision tree to analyse the acute phase of COVID-19 infection after hospital admission, and a Markov model to analyse rest-of-life.

The model uses data from RECOVERY to inform mortality while in hospital, progression to higher levels of oxygen support, length of hospital stay and incidence of adverse events (clinical data cutoff date January 2021). It informs post-acute phase mortality with lifetable statistics, healthcare costs with national cost sources and health state utility with the literatue.

Figure 1. Model structure



Results

The results from the analysis show that tocilizumab can be considered a cost-effective treatment for COVID-19 in hospital patients on corticosteroids who require supplemental oxygen or mechanical ventilation and have a CRP level of ≥ 75mg/L.

These results are driven by:

- reduced healthcare costs from preventing the requirement of higher levels of oxygen support while in the acute phase (this results in tocilizumab being cost saving);
- Increased quality-life years (QALYs) from the reduction of mortality that allows more patients to exit the acute phase.

Even after accounting for uncertianty of the model inputs via a probabilistic scenario analysis, the overall results do not change.

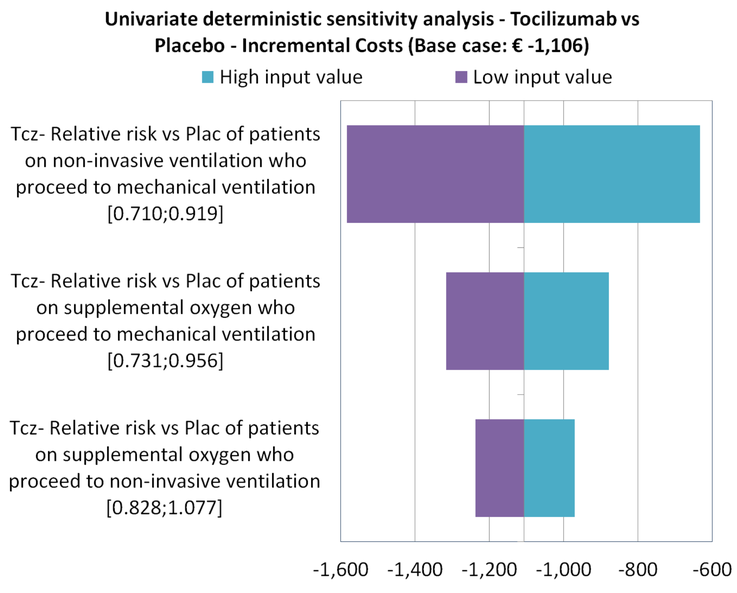
Table 1. Results from Deterministic and Probabilistic Analysis

Analysis	Incremental Costs	Incremental QALYs	ICER
Deterministic	€ - 1, 106	0.81	Tocilizumab Dominant
Probabilistic	€ - 1, 264	0.81	Tocilizumab Dominant

Univariate Deterministic Sensitivity Analysis

Figure 2 presents the results from the univariate deterministic sensitivity analysis of the probability to progressing to higher levels of oxygen support while on hospital and mortality risk in hospital. Upper and lower values for each of the inputs corresponds to the values at the 90th and 10th percentile of the distribution generated via the PSA. The results are consistent with the base case analysis.

Figure 2. Results from Univariate Deterministic Sensitivity Analysis



Conclusion

The analysis shows that tocilizumab is a cost-effective treatment for hospital patients with COVID-19 on corticosteroids, requiring supplemental oxygen or mechanical ventilation and having CRP levels of ≥ 75mg/L.

References

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Disclosures

All authors are employed by F. Hoffmann-La Roche Ltd and Roche S.p.a