

Abstract

Objectives: The objective of this study was to estimate the association between tocilizumab or corticosteroids and the risk of intubation or death in patients with coronavirus disease 19 (COVID-19) with a hyperinflammatory state according to clinical and laboratory parameters.

Methods: A cohort study was performed in 60 Spanish hospitals including 778 patients with COVID-19 and clinical and laboratory data indicative of a hyperinflammatory state. Treatment was mainly with tocilizumab, an intermediate-high dose of corticosteroids (IHDC), a pulse dose of corticosteroids (PDC), combination therapy, or no treatment. Primary outcome was intubation or death; follow-up was 21 days. Propensity score-adjusted estimations using Cox regression (logistic regression if needed) were calculated. Propensity scores were used as confounders, matching variables and for the inverse probability of treatment weights (IPTWs).

Results: In all, 88, 117, 78 and 151 patients treated with tocilizumab, IHDC, PDC, and combination therapy, respectively, were compared with 344 untreated patients. The primary endpoint occurred in 10 (11.4%), 27 (23.1%), 12 (15.4%), 40 (25.6%) and 69 (21.1%), respectively. The IPTW-based hazard ratios (odds ratio for combination therapy) for the primary endpoint were 0.32 (95%CI 0.22-0.47; $p < 0.001$) for tocilizumab, 0.82 (0.71-1.30; $p = 0.82$) for IHDC, 0.61 (0.43-0.86; $p = 0.006$) for PDC, and 1.17 (0.86-1.58; $p = 0.30$) for combination therapy. Other applications of the propensity score provided similar results, but were not significant for PDC. Tocilizumab was also associated with lower hazard of death alone in IPTW analysis (0.07; 0.02-0.17; $p < 0.001$).

Conclusions: Tocilizumab might be useful in COVID-19 patients with a hyperinflammatory state and should be prioritized for randomized trials in this situation.

Keywords: COVID-19; Cohort study; Corticosteroids; Hyperinflammatory state; Mortality; Tocilizumab.

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