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Association of immunotherapy and immunosuppression with severe COVID-19 disease in patients with cancer

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Background: Cytokine storm due to COVID-19 can cause high morbidity and mortality. Patients with cancer treated with immunotherapy (IO) and those with immunosuppression may have higher rates of cytokine storm due to immune dysregulation.

We sought to examine the association of IO and immunosuppression with severe COVID-19 outcomes and cytokine storm occurrence among patients with cancer and COVID-19 based on data from the COVID-19 and Cancer Consortium (CCC19).

Methods: A registry-based retrospective cohort study was conducted on patients reported to the CCC19 registry from March 2020 to September 2021. The primary outcome was defined as an ordinal scale of COVID-19 severity. The secondary outcomes were IO therapy and cytokine storm. Cytokine storm was defined biologically and clinical evidence of severe inflammation, with end-organ dysfunction (Fagenbaum D.C. et al., N Engl J Med., 2020). The association of IO or immunosuppression with the outcomes of interest were evaluated using a multivariable logistic regression balanced for covariate distributions through inverse probability of treatment weighting (IPTW).

Results: A total of 10,214 patients were included, among which 482 (4.7%) received IO, 2,364 (23.4%) received non-IO systemic therapies, and 6,017 (58.9%) were not treated in the 3 months prior to COVID-19 diagnosis. No difference in COVID-19 severity or the development of a cytokine storm was found in the IO group compared to the untreated group (aOR: 0.77; 95%CI:0.45-1.32, and aOR: 1.06; 95%CI:0.42-2.67, respectively). On multivariable analysis, patients with both outcomes associated with worse outcomes both in relation to COVID-19 severity (aOR: 1.89; 95%CI:1.51-2.35) and the presence of a cytokine storm (aOR: 1.75; 95%CI:3.0-2.35).

Conclusions: Administration of IO was not associated with severe outcomes in patients with cancer and COVID-19, whereas pre-existing baseline immunosuppression appears to be independently associated with worse clinical outcomes including cytokine storm.
Patients with advanced cancer progressing on standard treatment are eligible. Each cohort is de-randomized combined basket- and umbrella-trial, patients are enrolled into multiple phases experienced similar CFR28 (27.5%, 28%, 29%). Following propensity score matching, 42 unvaccinated Omicron patients were matched with 122 and 121 patients from the Pre-vaccination and Alpha-Delta phases respectively, based on country of origin, sex, age, comorbidity burden, primary tumour, cancer stage and status, and the receipt of systemic anticancer therapy at COVID-19. Unvaccinated Omicron patients experienced improved COVID-19 outcomes in comparison to patients diagnosed during the Pre-vaccination phase. Morbidity and mortality were comparable to those of unvaccinated patients diagnosed during the Alpha-Delta phase.