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Immune Checkpoint Inhibitor Use And Acute Kidney Injury Risk in Cancer Patients with COVID-19

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Objectives : COVID-19 can cause acute kidney injury (AKI) through immune-mediated mechanisms, and cancer patients are particularly vulnerable to both severe COVID-19 and renal complications. Immune checkpoint inhibitors (ICIs) are widely used in cancer treatment; however, their impact on AKI risk in patients with COVID-19 remains unclear. We aimed to evaluate the association between ICI therapy and incidence of AKI among cancer patients with COVID-19.

Methods : We conducted a retrospective cohort study of 910 cancer patients with confirmed COVID-19 via SARS-CoV-2 PCR between 2020 and 2023 at a tertiary referral academic hospital in South Korea. Propensity score matching (PSM; 1:3 ratio) was employed to compare outcomes between ICI-treated and non-ICI-treated patients. The incidence and severity of AKI were analyzed using logistic regression models. Patients were further classified for subgroup analyses: (1) ICI monotherapy, (2) ICI plus chemotherapy, (3) chemotherapy alone, and (4) no anticancer treatment. Subgroup comparisons were further evaluated using pairwise and generalized PSM.

Results : In the matched cohort, AKI occurred in 13.8% of ICI-treated patients compared to 31.0% of non-ICI-treated patients ($P=0.002$). Multivariable logistic regression identified ICI treatment as an independent predictor of reduced risk of AKI (vs. non-ICI-treated group, adjusted odds ratio 0.37, 95% confidence interval 0.19–0.75, $P=0.005$). Subgroup analyses revealed that ICI monotherapy group had the lowest AKI incidence (5.3%) compared to ICI plus chemotherapy (21.1%), chemotherapy alone (26.3%), and no treatment groups (23.7%). These results were consistent across subgroup analyses. No significant difference was observed in 90-day overall survival between the matched groups.

Conclusions : In cancer patients with COVID-19, ICI exposure was not associated with an increased risk of AKI. Instead, ICI use—particularly as monotherapy—was associated with a significantly lower incidence of AKI compared to other treatment modalities. These findings suggest that ICI-based treatment may not pose an additional renal risk in cancer patients with COVID-19.