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Characterization of COVID-19 vaccination response by antibody (Ab) titer and T-cell receptor (TCR) sequencing in patients (pts) with advanced genitourinary (GU) cancers

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Background

Preliminary studies have characterized potential adverse effects associated with COVID-19 vaccination in pts with cancer. However, biological characterization of vaccine response has yet to be performed.

Methods

Eligible pts with advanced GU cancers (metastatic/unresectable prostate, bladder and renal cell carcinoma [RCC]) and had not yet received COVID-19 vaccination. Pts were consented to receive sequential blood draws prior to vaccination and at landmarks of 2, 6, and 12 mos following vaccination. Pts on systemic treatment had additional blood draws coinciding with their first 3 cycles of therapy following vaccination. Ab titers to SARS-CoV-2 were quantified via ELISA and reported as an immune status ratio (ISR). RNA was extracted from PBMC aliquots, converted into cDNA and TCR α/β sequences were selectively amplified. TCR abundance and homology clustering was performed using custom scripts.

Results

As of May 14, 2021, 130 pts had consented to the study of whom 126 pts submitted baseline (BL) specimens. The current analysis focuses on 56 pts who submitted cycle 1 (C1) specimens. Among these, 29, 26, and 1 pts had RCC, prostate and bladder cancer, respectively; 19 were on checkpoint inhibitor (CPI)-based regimens while 37 were on non-CPI regimens. BNT162b2 (Pfizer) was the most commonly administered vaccine in the cohort (n=29), followed by mRNA-1273 (Moderna; n=26). COVID-19 Ab titers increased significantly from BL to C1 across the cohort from 0.19 (interquartile range [IQR] 0.12-0.18) to 4.37 (IQR 0.2-6.60; P<0.0001). However, 8/56 pts (14.3%) receiving CPI-based regimens and 8/56 pts (14.3%) receiving non-CPI-based regimens were noted to have negative Ab titers after a median of 18 and 35 days following initial vaccination, respectively. No significant difference was observed in the increase from BL to C1 in pts receiving CPI vs non-CPI-based regimens. Specimen collection is ongoing; updated Ab titer data and TCR sequencing data will be presented.

Conclusions

Our data prompt concern for delayed or insufficient COVID-19 Ab response in a subset of pts with advanced GU cancers.

Legal entity responsible for the study

The authors.

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Disclosure

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