2021 ESMO congress

1557O

Adaptive immunity to SARS-CoV-2 infection and vaccination in cancer patients: The CAPTURE study

S.T.C. Shepherd[1], A. Fendler[2], L. Au[2], F. Byrne[2], K. Wilkinson[3], M. Wu[4], A.M. Schmitt[5], N. Joharatnam-Hogan[5], B. Shum[5], L. Del Rosario[5], K. Edmonds[1], E. Carlyle[1], E. Nicholson[6], M. Howell[4], C. Swanton[7], S. Walker[8], G. Kassiotis[9], R. Wilkinson[3], J. Larkin[10], S. Turajlic[2]

[1] The Renal & Skin Unit, The Royal Marsden Hospital - NHS Foundation Trust, London, UK, [2] Cancer Dynamics Laboratory, The Francis Crick Institute, London, UK, [3] Tuberculosis Laboratory, The Francis Crick Institute, London, UK, [4] High Throughput Screening, The Francis Crick Institute, London, UK, [5] Medical Oncology, The Royal Marsden Hospital - NHS Foundation Trust, London, UK, [6] Haemato-Oncology, The Royal Marsden Hospital - NHS Foundation Trust, London, UK, [7] Francis Crick Institute, London, UK, [8] Department of Anaesthesia and Critical Care, The Royal Marsden Hospital - NHS Foundation Trust, London, UK, [9] Retroviral Immunology Laboratory, The Francis Crick Institute, London, UK[10] Medicine, Royal Marsden Hospital NHS Foundation Trust, London, UK

Background

Patients with cancer are at increased risk of severe outcomes from COVID-19. Understanding the impact of SARS-CoV-2 infection and vaccination induced-immunity is an area of unmet need.

Methods

CAPTURE (NCT03226886) is a prospective longitudinal cohort study of COVID-19 vaccine or SARS-CoV-2 infection-induced immunity. SARS-CoV-2 infections were confirmed by RT-PCR and ELISA. Neutralising antibody titres (NAbT) against wild-type (WT) SARS-CoV-2 and variants of concern (VOC; Alpha, Beta, Delta) and SARS-CoV-2 specific T-cells (SsT-cells) were quantified.

Results

118 patients (89% solid malignancy, [SM]) were SARS-CoV-2-positive (median follow-up: 154 days). 85% patients were symptomatic; 2 died of COVID-19. 82% had S1-reactive antibodies, of whom 89% had neutralising antibodies (NAbs); NAbT were lower against all VOCs. While S1-reactive antibody levels declined over time, NAbT remained stable up to 329 days. Most patients had detectable SsT-cells (76% CD4+, 52% CD8+). Haematological malignancy (HM) patients had impaired immune responses that were disease and treatment-specific (anti-CD20), but with evidence suggestive of compensation from T-cells. 585 patients were evaluated following 2 doses of BNT162b2 or AZD1222 vaccines, administered 12 weeks apart. Seroconversion rates after 2 doses were 85% and 54% in patients with SM and HM, respectively. A lower proportion of patients had detectable NAbs against SARS-CoV-2 VOC (Alpha 62%, Beta 54%, Delta 49%) vs WT (84%), with corresponding significantly lower NAbT. Patients with HM were more likely to have an undetectable NAb and had lower NAbT vs solid malignancies to both WT and VOCs. Seroconversion showed poor concordance with NAbTs against VOCs. Prior SARS-CoV-2 infection boosted NAbT including against VOCs. Anti-CD20 treatment was associated with severely diminished NAbTs. Vaccine-induced T-cell responses were detected in 80% of patients, with no differences between vaccines or cancer types.

Conclusions

Patients with HM had blunted humoural responses to infection and vaccination, particularly against VOCs, but preserved cellular responses might contribute to protection. Our results lend support to prioritisation of all cancer patients for further booster vaccination.

Clinical trial identification

NCT03226886.

Legal entity responsible for the study

The Royal Marsden NHS Foundation Trust.

Funding

The Royal Marsden Charity; The National Institute for Health Research (NIHR) Biomedical Research Centre (BRC) at the Royal Marsden Hospital and Institute for Cancer Research (ICR).

Disclosure

All authors have declared no conflicts of interest.