INCIDENTAL FINDING OF COLORECTAL CANCER IN A COVID-19 PATIENT, FOLLOWED BY DEEP PROFILING OF SARS-COV-2-ASSOCIATED IMMUNE LANDSCAPE AND TUMOUR MICROENVIRONMENT

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Background Reports suggest that cancer patients may be more vulnerable to COVID-19, with increased disease severity and higher mortality rate.1–3 Although this is likely multifactorial, the exact pathogenesis has not been clearly elucidated. Studies have shown increased ACE2 expression in tumours as compared to normal tissues, thereby providing increased viral binding. Moreover, other mechanisms of cancer immunotherapy including treatment- and disease-related immunosuppression and functional exhaustion have been reported in patients with concomitant cancer and COVID-19; contributing to greater COVID-19 disease severity.4–8 There is still much to be revealed about the interplay between COVID-19, cancer and the immune system. These insights will give us greater understanding of the immunopathological processes underlying COVID-19 in cancer patients and their clinical relevance.

Methods A 45-year-old South Asian male diagnosed with COVID-19, with incidental discovery of stage II T3N0 caecal adenocarcinoma was consented for our study. The patient had experienced mild symptoms throughout the course of the disease, and underwent laparoscopic right hemicolectomy 10 days after recovery from COVID-19. His blood, lymph nodes, normal tissue and tumour samples were obtained for further analysis (figure 1). Multiplex immunohistochemistry was performed to understand SARS-CoV-2-associated tumour immune microenvironment. Moreover, to simulate ex vivo SARS-CoV-2 infection, dissociated cells from blood, lymph nodes, and tissue samples were stimulated with SARS-CoV-2 peptides or control for 16 hours. This was followed by 25-colour flow cytometry analysis for immune markers and cytokines. We then compared unstimulated with stimulated cells to study SARS-CoV-2-elicited immune response.

Results Multiplex immunohistochemistry demonstrated upregulated expression of ACE2 in the tumour as compared to adjacent normal tissue, whilst SARS-CoV-2 was detected only in adjacent normal tissue but not within the tumour (figure 2). We also observed SARS-CoV-2 in other organs such as appendix and lymph nodes; and the presence of tertiary lymphoid structure, abundant T cells and NK cells within the proximity of the tumour (figure 2). Additionally, upon stimulation with SARS-CoV-2 peptides, we successfully elicited SARS-CoV-2-specific CD4+ T cells expressing immune markers such as granzyme B, TNF-α and IFN-γ (figure 3). Deep profiling of
the samples is on-going with single-cell sequencing and digital spatial profiling.

**Conclusions** We believe this is the first report of immune profiling of in situ tumour microenvironment in a cancer patient with COVID-19. Our findings showed the presence of viral proteins in several tissues despite negative swab test result, and the ability to elicit ex vivo SARS-CoV-2-specific T cell responses through peptide stimulation experiments.

**Ethics Approval** This study was approved by Centralised Institutional Review Board of SingHealth; approval number 2019/2653.

**Consent** Written informed consent was obtained from the patient for publication of this abstract and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

**REFERENCES**


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