Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

protective efficacy for a majority of patients, associated *a priori* with an equal tolerance to the general population, though to be confirmed. Studies with stratification according to the type of treatment and the type of vaccine are a priority for the international oncology community.

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Checkpoint inhibitor therapy for skin cancer may be safe in patients with asymptomatic COVID-19

An ongoing area of uncertainty during the SARS-CoV-2 pandemic is the safety of immune checkpoint inhibitor (ICI) therapy for cancer and the theoretical possibility of exacerbated immune-related adverse events (irAEs) secondary to COVID-19 inflammatory pathology.[1] Current guidelines from the European Society of Medical Oncology (ESMO) recommend interruption of ICI treatment of patients with COVID-19 and advanced/metastatic cancer until recovery from infection, and postponement of treatment in the neoadjuvant/adjuvant setting.[2]

Between 1 September 2020 and 15 December 2020, our institution treated 343 patients with skin cancers, including 295 with melanoma, 39 with Merkel cell carcinoma (MCC), and 11 with cutaneous squamous cell carcinoma (cSCC) with ICIs (nivolumab, pembrolizumab, avelumab, or cemiplimab). At our centre, a program of public health surveillance was initiated in March 2020, during which all patients receiving immunotherapy were tested for SARS-CoV-2 infection before treatment. Per safety protocols, all patients were subjected to RT-PCR nasopharyngeal swab tests before initiation of therapy. Subsequently, all patients were monitored by serology for anti-SARS-CoV-2 immunoglobulin G (IgG) and immunoglobulin M (IgM) before receiving ICIs. Any patients with serologic positivity received nasopharyngeal swab tests to confirm potential infection. Anti-SARS-CoV-2 antibodies were detected in 50 of the 343 treated patients (14.6%). Of those 50, *de novo* infections confirmed by RT-PCR during or after treatment were detected in 17 (5%).

Here, we report that administration of ICIs was safe in these patients, with no increased incidence of irAEs or worsening of COVID-19 disease in patients with skin cancers incidentally discovered to be infected with SARS-CoV-2 through a median follow-up of 2.23 months (range 1-10 months). Although the prospect of delayed-onset irAEs remains a possibility, no new signals were reported during follow-up, and all of the patients recovered and are doing well. Importantly, among six patients who received ICIs 1 day before confirmed COVID-19 diagnosis by nasopharyngeal swab, no adverse events were observed, all infections were completely asymptomatic, and cancer therapy was reinitiated upon viral clearance. An additional 11 patients were found to be infected with SARS-CoV-2 within 10-30 days after their most recent cycle of immunotherapy, meaning that the effects of ICI were likely still present given known pharmacokinetics and pharmacodynamics of checkpoint blockade. Of these 11 patients, 6 developed mild COVID-19 symptoms, including fever, cough, and anosmia. Only one patient required hospitalization due to mild pneumonia, with findings of increased serum C-reactive protein

Table 1. Patient demographics, cancer characteristics, symptoms, and outcomes of SARS-CoV-2 infection during checkpoint inhibitor therapy

	Sex	Age (years)	ECOG status	Comorbidity	Cancer diagnosis	Cancer stage	ICI administered	Date ICI initiated	Date SARS-CoV-2 detected	Date negative PCR test	COVID-19 symptoms	COVID-19 resolution	Restart cancer treatment
SARS-CoV-2 detected day after ICI infusion													
1	Male	71	0	Hypertension	cSCC	Locally advanced	Cemiplimab	20 June 2020	06 November 2020	20 November 2020	None	Yes	Yes
2	Male	55	0	None	Melanoma	Metastatic	Nivolumab	12 October 2018	30 October 2020	01 December 2020	None	Yes	Yes
3	Male	66	0	None	Melanoma	Metastatic	Nivolumab	19 February 2020	18 November 2020	01 December 2020	None	Yes	Yes
4	Female	35	0	None	Melanoma	Metastatic	Nivolumab	31 August 2018	05 November 2020	27 November 2020	None	Yes	Yes
5	Female	61	0	None	Melanoma	Adjuvant	Pembrolizumab	02 January 2020	16 November 2020	10 December 2020	None	Yes	Yes
6	Male	55	0	None	Melanoma	Adjuvant	Nivolumab	05 October 2020	02 November 2020	02 December 2020	None	Yes	Yes
SARS-CoV-2 detected 10-30 days after most recent cycle of ICI													
1	Female	28	0	None	Melanoma	Adjuvant	Pembrolizumab	09 March 2020	15 November 2020	04 December 2020	None	Yes	Yes
2	Female	47	0	None	Melanoma	Adjuvant	Nivolumab	17 January 2020	10 November 2020	27 November 2020	Fever G1	Yes	Yes
3	Male	54	0	None	Melanoma	Adjuvant	Nivolumab	31 January 2020	10 November 2020	28 November 2020	Pneumonia G1	Yes	No
4	Female	43	0	None	Melanoma	Metastatic	Nivolumab	15 January 2019	28 October 2020	26 November 2020	Fever G1	Yes	Yes
5	Male	60	0	None	Melanoma	Metastatic	Pembrolizumab	06 March 2019	16 October 2020	11 November 2020	None	Yes	Yes
6	Male	43	1	None	Melanoma	Metastatic	Nivolumab	15 June 2020	06 November 2020	27 November 2020	Fever G1	Yes	Yes
7	Female	47	0	None	Melanoma	Metastatic	Nivolumab	13 April 2018	16 November 2020	02 December 2020	Anosmia G1	Yes	Yes
8	Male	78	1	Cardiac arrhythmia	cSCC	Locally advanced	Cemiplimab	30 June 200	27 November 2020	10 December 2020	None	Yes	Yes
9	Male	75	0	Cardiovascular disease	cSCC	Locally advanced	Cemiplimab	09 August 2019	03 December 2020	21 December 2020	None	Yes	Yes
10	Male	69	0	None	Melanoma	Metastatic	Nivolumab + ipilimumab	05 June 2019	03 December 2020	10 December 2020	Pneumonia G2	Yes	No
11	Male	68	0	None	Melanoma	Metastatic	Nivolumab	06 April 2020	16 November 2020	30 November 2020	None	Yes	Yes

cSCC, cutaneous squamous cell carcinoma; ECOG, Eastern Cooperative Oncology Group; G1/G2, Grade 1/Grade 2; ICI, immune checkpoint inhibitor.

(CRP) and d-dimer levels, all of which resolved. Patient characteristics, symptoms defined by Common Terminology Criteria for Adverse Events (CTCAE) 5.0,[3] and outcomes are summarized in Table 1.

Although risk-benefit calculations during the pandemic must consider several variables, including potential survival benefit, possibility of developing COVID-19 hyperinflammation,[4] and patient risk factors and preferences, these data, along with other emerging evidence, suggests that the use of ICIs in the presence of SARS-CoV-2 infection may be safe for patients with mild or asymptomatic COVID-19 who are likely not at risk for developing hyperinflammatory disease. We found that of the 17 patients with concomitant ICI therapy and SARS-CoV-2 infection, only 6 (35%) developed symptoms, all of which were mild, and 15 (88%) resumed therapy. These findings are in line with initial results from the Thoracic Cancers International COVID-19 Collaboration (TERAVOLT) registry, which found that although mortality was high among patients with lung cancers, no evidence was found that COVID-19 outcomes were worse in the small subset of patients receiving ICIs compared with the overall cohort.[5] A subsequent analysis at Memorial Sloan Kettering Cancer Center in New York similarly found that PD-1 blockade was not associated with increased risk of severity of COVID-19.[6] The outcomes we describe are also consistent with other reports of safe ICI therapy in patients with melanoma and COVID-19.[7,8] Larger studies will be needed to definitively establish safety and efficacy. Additionally, it will be important to consider logistical concerns for isolating SARS-CoV-2-infected patients to prevent further spread and the potential for exposing vulnerable individuals, such as those living with cancer, to the virus. The oncology community mobilized and adapted to unprecedented circumstances during the past year, and efforts must continue to provide lifesaving care while minimizing risks for both healthcare workers and patients.

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Clinical outcome of SARS-CoV-2 infection in breast and ovarian cancer patients who underwent antiestrogenic therapy

Several studies have reported a higher susceptibility of men to develop severe respiratory disease following severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection when compared with women.[1,2] To explore the implication of hormonal regulation in coronavirus disease-2019 (COVID-19) clinical outcomes, we assessed SARS-CoV-2 infections, hospital admissions, and deaths in women affected by hormone-driven cancers (HDCs) and treated with antiestrogen therapies (AETs).