

# Letters

## RESEARCH LETTER

### Incidence of SARS-CoV-2 Infection Among Patients Undergoing Active Antitumor Treatment in Italy

The interactions between cancer and susceptibility to coronavirus disease 2019 (COVID-19) are poorly understood. Early reports suggested a higher COVID-19 risk in patients with cancer not specifically selected for recent anticancer treatment,<sup>1,2</sup> but data on severe acute respiratory syndrome

coronavirus 2 (SARS-CoV-2) transmission among patients undergoing antitumor treatment are lacking.

**Methods** | To calculate the rate of SARS-CoV-2 infection among patients receiving antitumor treatment, data on patients treated at 118 Medical Oncology Units affiliated with the Collegio Italiano dei Primari Oncologi Medici Ospedalieri (CIPOMO)<sup>3</sup> were collected in a retrospective study (CIPOMO-ONCO-COVID-19).

**Table 1. Characteristics of the Studied Population Stratified by SARS-CoV-2 Development**

Characteristic	No. (%)		
	Total population of patients receiving active antitumor treatment (January 15–May 4, 2020)	Patients developing SARS-CoV-2 infection	Patients not developing SARS-CoV-2 infection
No.	59 989	406 (0.68)	59 583 (99.32)
Age, median (range), y	65 (20–97)	68 (28–89)	65
Female	31 876 (53.2)	184 (45.3)	31 692 (53.2)
Male	25 878 (43.1)	219 (53.9)	25 659 (43.1)
Unknown	2235 (3.7)	3 (0.7)	2232 (3.7)
Cancer type			
Lung	5460 (9.1)	91 (22.4)	5369 (9)
Breast	10 321 (17.2)	75 (18.5)	10 246 (17.2)
Colorectal	6141 (10.2)	38 (9.4)	6103 (10.3)
Prostate	2735 (4.6)	35 (8.6)	2700 (4.5)
Other	12 826 (21.4)	164 (40.4)	12 662 (21.3)
Gynecologic	NS	19 (4.7)	NS
Urothelial	NS	15 (3.7)	NS
Hematologic	NS	24 (5.9)	NS
Upper GI (gastric, biliary, pancreatic)	NS	42 (10.3)	NS
Melanoma and skin	NS	11 (2.7)	NS
Kidney	NS	9 (2.2)	NS
Soft tissue sarcoma	NS	17 (4.2)	NS
Others types of tumor	NS	27 (6.7)	NS
Unknown	22 506 (37.5)	3 (0.7)	22 503 (37.5)
Antineoplastic therapy			
Chemotherapy +/- biologics	20 895 (34.8)	244 (60.1)	20 651 (34.7)
Chemo-immunotherapy	1099 (1.8)	8 (2)	1091 (1.8)
Immunotherapy	4327 (7.2)	41 (10.1)	4286 (7.2)
Targeted	5974 (10)	74 (18.2)	5900 (9.9)
Others	3881 (6.5)	36 (8.9)	3845 (6)
Hormone	NA	34 (8.4)	NA
Other types of treatment	NA	2 (0.5)	NA
Unknown	23 813 (39.7)	3 (0.7)	23 810 (40)
Clinical presentation			
Symptomatic	NA	339 (83.4)	NA
Asymptomatic (contact with a known positive case)	NA	63 (15.6)	NA
Unknown	NA	4 (1)	NA
Hospitalization			
Yes	NA	314 (77.3)	NA
No	NA	87 (21.4)	NA
Unknown	NA	5 (1.2)	NA

Abbreviations: NA, not applicable; NS, not specified; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

**Table 2. Rates of SARS-CoV-2 Infection Among Patients Undergoing Antineoplastic Treatment in 118 Medical Oncology Units Compared With the General Italian Population by May 4, 2020**

Variable	Patients receiving antitumor treatment		General population <sup>a</sup> , infection rates %	RR (95% CI)
	SARS-CoV-2 positive cases/total patients receiving antitumor treatment	Infection rates % (95% CI)		
Italy (whole country)	406/59 989	0.68 (0.61-0.75)	0.39	1.42 (1.29-1.56) <sup>b</sup>
Northern Italy	355/36 996	0.96 (0.86-1.06)	0.68	1.40 (1.26-1.55)
Central Italy	35/10 896	0.32 (0.22-0.45)	0.22	1.47 (1.0-2.04)
Southern Italy and islands	16/12 097	0.13 (0.08-0.21)	0.08	1.65 (0.94-2.68)

Abbreviations: RR, relative risk of SARS-CoV-2 infection in patients receiving antitumor treatment compared to the general Italian population; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

<sup>a</sup> Rates of infection in the general population were derived from reports of the Italian Istituto Superiore della Sanità.<sup>4</sup>

<sup>b</sup> Results adjusted by geographical area.

For each center, aggregate data were registered on all patients who received at least 1 course of an active anticancer treatment between January 15 and May 4, 2020. Individual data were collected for those developing COVID-19 as assessed through polymerase chain reaction (PCR) test from a nasopharyngeal swab (driven by either symptoms or contact with a known positive case). Results were compared with those reported for the general Italian population over the same time period.<sup>4</sup> This study was approved by the Ethics Committee of the Lazzaro Spallanzani National Institute of Infectious Diseases with informed consent waiver for critically ill patients because all data were deidentified.

**Results** | Of 59 989 patients receiving antitumor treatment between January 15, 2020, and May 4, 2020, 406 developed COVID-19 with a positive nasopharyngeal PCR test result (0.68%; 95% CI, 0.61%-0.75%).

The median (range) age of infected patients was 68 (28-89) years. Most were symptomatic (n = 339, 83%), and 314 (77%) required hospitalization. Lung cancer was the most common tumor (n = 91, 22%), and chemotherapy the most represented antitumor treatment (n = 252, 62%) (Table 1). The infection rate was higher compared with the general Italian population during the same time period and varied between different geographical areas (Table 2<sup>4</sup>).

**Discussion** | To our knowledge, this study represents the largest investigation on the incidence of SARS-CoV-2 in patients with cancer and the first to focus specifically on patients receiving antitumor treatment. The 0.68% rate of infection that we found is low compared with the benefits achievable with most oncologic treatments. Notably, the infection rate remained below 1% even in the area with the greatest COVID-19 spread, partly reflecting reorganization measures implemented in medical oncology units in Italy at the onset of this outbreak.<sup>3</sup>

Our estimates should be regarded as conservative because this was not a screening study and could not capture asymptomatic patients without a known contact. Patients receiving antitumor treatment, however, are frequently visited in an oncologic day hospital with lower thresholds for testing. Underestimation is thus unlikely compared with incidences reported in the community. On the other hand, the strict definition of positive cases (PCR test) minimizes overestimation errors compared with previous reports.<sup>2</sup>

Compared with the general Italian population, patients receiving antineoplastic treatment appeared to have a higher risk

of developing COVID-19 (Table 2). Rather than reflecting a higher biologic susceptibility to SARS-CoV-2, this could depend on the different age distribution of the 2 groups, with patients with cancer being on average older than the general population, and on a higher likelihood of viral exposure for patients owing to multiple and continued hospital visits. The lower rates of infection among patients with cancer in areas with lower degrees of COVID-19 spread seems to be consistent with this hypothesis (Table 2).

**Conclusions** | To our knowledge, this study provides the first estimate of the rate of SARS-CoV-2 infection among patients receiving antitumor treatment on a large population of approximately 60 000 patients treated at more than 110 oncology units. From a clinical point of view, the low probability of SARS-CoV-2 infection among these patients (<1%) supports the continuation of most oncologic treatments in the adjuvant and metastatic setting. Based on the present data, delaying active antitumor treatment to avoid SARS-CoV-2 transmission should not be routinely recommended.

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