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Letter

Screening for COVID-19 in Symptomatic Cancer Patients in a Cancer Hospital

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As the coronavirus disease 2019 (COVID-19) pandemic continues, cancer patients were found to be vulnerable and to have difficulty receiving routine care. We analyzed patients who received screening for COVID-19 at The Cancer Institute Hospital of Japanese Foundation for Cancer Research from April 13, 2020, to June 19, 2020. A total of 58,584 cases were screened by a questionnaire, and 231 patients underwent chest computed tomography (CT), among which 12 patients had typical CT findings indicative of COVID-19 and 107 patients received the polymerase chain reaction (PCR) test for SARS-CoV-2 with 0% infection prevalence (Table S1). Our study concludes that the incidence of COVID-19 in cancer patients is low in Japan, even among those with COVID-19-like symptoms and typical CT findings, and that proper management is required for preventing virus transmission and maintaining treatment for cancer patients during the pandemic.

The ongoing worldwide COVID-19 pandemic dramatically affects daily care for patients with cancer. Patients of COVID-19 with cancer were found to have a high mortality rate, and preventing the transmission of SARS-CoV-2 in a cancer hospital is important for maintaining cancer treatment (Lee et al., 2020a). However, cancer patients frequently exhibit

cancer-specific or treatment-specific symptoms that resemble those of COVID-19 (Al-Shamsi et al., 2020a; Naidoo et al., 2020). Thus, it is essential to establish a screening strategy for patients with COVID-19-like symptoms to prevent further infections and to provide cancer care.

As of April 13, 2020, there were 7,255 cases of COVID-19 in Japan, ranked 5th in Asia and 24th in the world in terms of total COVID-19 cases, and experiencing the apex of the pandemic (World Health Organization, 2020). In response to these difficulties, we screened 58,584 patients who visited our hospital from April 13, 2020, to June 19, 2020, by using a two-step screening strategy combining a questionnaire, a chest CT, and a nasopharyngeal PCR swab. The questionnaire asked about (1) the patient's contact with COVID-19 patients within the past 2 weeks, (2) the patient's history of travelling abroad within the past 2 weeks, (3) fever over 37.5°C within 3 days, (4) cough and/or shortness of breath appearing within the past 2 weeks, and (5) dysgeusia and/or dysosmia appearing within the past 2 weeks. If patients met one of these criteria, they underwent second screening including chest CT and the PCR test for SARS-CoV-2 if necessary.

After answering the questionnaire, 231 patients underwent a second screening (Table S1). The median patient age was 67 years (IQR, 55–72), and 116 patients (50.2%) were men. Cancer was active in 174 patients, with 77 (33.3%) patients with metastasis and 58 (25.1%) with recurrence. The most frequent cancer type was lung cancer (n = 42), followed by breast cancer (n = 31) and gastric cancer (n = 28). Within 1 month before the screening, 142 (61.5%) patients received cancer treatment. Cytotoxic chemotherapy was most frequent (n = 91), followed by molecular-targeting therapy (n = 35) and immunotherapy (n = 26).

Radiological features were independently reviewed by two radiologists and categorized into the following groups according to the expert consensus statement of the Radiological Society of North America (Simpson et al., 2020): negative for pneumonia (Cov19Neg, n = 145, 62.8%), indeterminate appearance or nonspecific features of COVID-19 pneumonia (Cov19Ind, n = 40, 17.3%), atypical appearance or uncommonly reported features of COVID-19 pneumonia (Cov19Aty, n = 34, 14.7%), and typical appearance or commonly reported imaging features of greater specificity for COVID-19 pneumonia (Cov19Typ, n = 12, 5.2%) (Table S1). Based on clinical information and



CT findings, 107 patients underwent the PCR test for SARS-CoV-2 but no patients got positive results.

There were various final diagnoses of symptoms that required screening (Table S1). The most common diagnosis was bacterial pneumonia, including aspiration pneumonia ($n = 33$, 14.3%), followed by cancer-related conditions such as tumor progression and adverse events due to cancer treatment. However, the specific cause for COVID-19-like symptoms was not identified in approximately one-fourth of patients.

We report here the clinical characteristics of 231 patients who underwent screening using chest CT and PCR for SARS-CoV-2. The cornerstone of COVID-19 diagnosis is the PCR test, which varies in sensitivity and may generate false negatives. Thus, multiple studies discuss the combination of PCR and chest CT for increased accuracy of detecting COVID-19. One meta-analysis of 16 studies ($n = 3,186$) shows that the sensitivity of chest CT was 92% (95%CI, 86%–96%), though the sensitivity of each study depends on the patients' characteristics, such as the severity of pneumonia (Xu et al., 2020).

In the present study, all patients underwent chest CT to increase the pretest probability of COVID-19 and to facilitate diagnoses. Also, the imaging facility is physically separated from the hospital, which prevents virus transmission. Despite increasing the pretest probability, we did not detect any positive cases of COVID-19, suggesting that abnormal CT findings were more associated with multiple causes among cancer patients (Table S1). These findings should serve to caution oncologists that COVID-19-like symptoms and CT findings do not always indicate COVID-19 pneumonia. Because no cases of COVID-19 were detected in our research, we were unable to evaluate

the sensitivity and specificity of the combination PCR and chest CT analyses. However, no studies other than ours have focused on the incidence of COVID-19 in symptomatic patients with cancer, and our results were consistent with the low prevalence (around 1%) of COVID-19 in asymptomatic patients reported by cancer hospitals in the United Arab Emirates and the United Kingdom (Al-Shamsi et al., 2020b; Lee et al., 2020b).

Our research shows that cancer-associated causes outweighed the possibility of COVID-19 among cancer patients with COVID-19-like symptoms. Although there were no confirmed cases of COVID-19 via PCR, the strategy employing CT and separating patients suspected with COVID-19 facilitated the diagnosis of patients with COVID-19-like symptoms. Appropriate management of separation, screening, and diagnosis in a cancer hospital is required for maintaining cancer treatment during this pandemic era.

SUPPLEMENTAL INFORMATION

Supplemental Information can be found online at <https://doi.org/10.1016/j.ccell.2020.09.017>.

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