



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.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

## Letter

# Utility of Preoperative Computed Tomography Scans for Coronavirus Disease in a Cancer Treatment Center

Yukinori Ozaki,<sup>1,4</sup> Jun Masuda,<sup>1,4</sup> Akemi Kataoka,<sup>1,\*</sup> Katsunori Oikado,<sup>2</sup> Natsue Uehiro,<sup>1</sup> Lina Inagaki,<sup>1</sup> Chieko Kato,<sup>3</sup> Hidetomo Morizono,<sup>1</sup> Toshimi Takano,<sup>1</sup> Takayuki Ueno,<sup>1</sup> and Shinji Ohno<sup>1</sup>

<sup>1</sup>Breast Oncology Center, The Cancer Institute Hospital of Japanese Foundation for Cancer Research, Tokyo, Japan

<sup>2</sup>Diagnostic Imaging Center, The Cancer Institute Hospital of Japanese Foundation for Cancer Research, Tokyo, Japan

<sup>3</sup>Department of Ultrasound, The Cancer Institute Hospital of Japanese Foundation for Cancer Research, Tokyo, Japan

<sup>4</sup>These authors contributed equally

\*Correspondence: [akemi.kataoka@jfcrr.or.jp](mailto:akemi.kataoka@jfcrr.or.jp)

<https://doi.org/10.1016/j.ccell.2020.12.004>

An appropriate screening system for COVID-19 for surgical patients is required in a cancer treatment center due to the risk of worse surgical outcomes and nosocomial spread. However, the risk benefit of preoperative computed tomography (CT) scans for COVID-19 is uncertain. We retrospectively analyzed pre-admission CT scans for COVID-19 screening between April 26, 2020, and June 12, 2020, in asymptomatic patients scheduled for surgery at the Cancer Institute Hospital of Japanese Foundation for Cancer Research, in a community with a low COVID-19 prevalence in Tokyo, Japan. A total of 863 patients were enrolled; 2.7% of the patients were diagnosed with pneumonia (95% confidence interval [CI]: 1.8–4.0) without subsequent PCR-positive results, while incidental findings were detected in 3.2% (95% CI: 2.3–4.6). We concluded that pre-admission screening CT scans for COVID-19 in a surgical population are not recommended due to their limited value in regions with a low COVID-19 prevalence.

The COVID-19 prevalence was low in Tokyo, Japan, with a 1.9% PCR positivity rate as of June 2020. Patients with cancer are particularly vulnerable and have a high mortality rate (Westblade et al., 2020); therefore, the nosocomial transmission of SARS-CoV-2 in a cancer center has been of particular concern (Bakouny et al., 2020; Liang et al., 2020). To prevent transmission in the operating room by asymptomatic carriers of SARS-CoV-2, we have established routine COVID-19 screening with questionnaire and CT scans for all pre-admission patients scheduled for cancer surgery (Fujiwara et al., 2020). Screening with CT scans

has a risk of false-negative results and incidental findings, which can lead to additional medical care including unnecessary tests, high costs, and patient anxiety (Lumbreras et al., 2010; O'Sullivan et al., 2018). Notably, incidental findings of pre-admission CT scans may force surgeons to make urgent decisions. We present results of the CT scans for COVID-19 screening, including the frequency of incidental findings.

We conducted a single institutional retrospective study. Patients without COVID-19 symptoms who were admitted in the Cancer Institute Hospital of Japanese Foundation for Cancer Research and who underwent surgery or endoscopic treatment from April 26, 2020, to June 12, 2020, were enrolled in the study. All the preadmission CT scans for COVID-19 screening were obtained 1 or 2 days before surgery and interpreted by two trained radiologists. We analyzed the incidence of pneumonia, PCR positivity rate, and rate of incidental findings. Based on the necessity of urgent subsequent management, we classified incidental findings into four categories as shown in Table S1.

COVID-19 was screened in 863 patients. The median patient age was 58 (range, 11–91) years, and 511 (59%) patients were female. The most common primary disease was breast cancer (22%), followed by colorectal cancer (16%) and gynecological cancers (13%). The CT scans revealed pneumonia in 23 patients (2.7%). Surgery was postponed in patients who had typical or indeterminate findings on CT; however, PCR tests revealed a 0% infection prevalence. The possibility of false negative of PCR should

be taken into account, especially in patients with pulmonary malignancy (Pruis et al., 2020).

PCR was performed in patients with susceptible CT pulmonary findings of COVID-19. Even if the subsequent PCR test for SARS-CoV-2 was negative in these patients, surgery was postponed for approximately 2 weeks after the test. This screening system has a risk of unnecessary surgery deferral, like in 2.7% in our population.

The CT scans also showed incidental findings in 28 cases (3.2%), including one pneumothorax and 27 malignancy-related findings (Table S1). Among those incidental findings, 82% were classified as category 0–2, which represented benign changes or no need for a change of operative procedures or treatment plans. In category 2, mammography and ultrasonography were performed in three patients with incidental breast nodules after they recovered from surgery. While two of them were diagnosed with stage I invasive breast carcinoma, the other had no abnormal findings. In 18% of category 3 incidental findings, four patients' surgeries were postponed or their operative procedures were changed due to lung metastasis, liver metastasis, and bone metastasis.

Our analysis demonstrated a higher rate of malignancy-related incidental findings than that of pneumonia suspecting COVID-19. Although some patients could avoid receiving inappropriate surgery, most of the incidental findings were classified into category 0–2, which led to additional tests or a long-term follow-up. These findings were less likely to improve the prognosis of those patients.



In this COVID-19 pandemic era, an optimal screening or managing system of COVID-19 for patients with cancer is required and should be based on the risk-benefit balance. We found that screening for COVID-19 with a pre-admission CT scan before surgery for patients with cancer without symptoms detected pneumonia (2.7%) unrelated to COVID-19 and incidental findings (3.2%). We concluded that pre-admission screening CT scans for COVID-19 in a surgical population is not recommended due to their limited value in regions with low COVID-19 prevalence.

#### SUPPLEMENTAL INFORMATION

Supplemental Information can be found online at <https://doi.org/10.1016/j.ccell.2020.12.004>.

#### ACKNOWLEDGMENTS

We are grateful to the patients included in this study and all the medical staff involved in the clinical practice.

#### DECLARATION OF INTERESTS

Y.O. reports personal fees from Novartis, BMS, Lilly, Eisai, Chugai, Taiho, Alagan, Ono Pharma-

ceutical, Kyowa Kirin, and Pfizer outside the submitted work. J.M. reports personal fees from TORAY outside the submitted work. A.K. reports personal fees from Artnature Inc. and JTB Benefit Service Inc. outside the submitted work. K.O. reports personal fees from Daiichi-Sankyo, AstraZeneca, Ono Pharmaceutical, and Takeda Pharmaceutical outside the submitted work. T.T. reports grants and personal fees from Daiichi-Sankyo, grants and personal fees from Chugai, grants and personal fees from Kyowa Kirin, grants and personal fees from Eisai, grants from Ono Pharmaceutical, grants from BMS, grants from MSD, grants from Merck Serono, grants from Taiho, grants from Novartis, personal fees from Pfizer, personal fees from Eli Lilly, and personal fees from Celltrion Healthcare outside the submitted work. T.U. reports personal fees from Chugai, grants and personal fees from Eisai, personal fees from AstraZeneca, personal fees from Taiho, and personal fees from Novartis outside the submitted work. S.O. reports personal fees from Chugai, grants and personal fees from Eisai, grants and personal fees from Taiho, personal fees from AstraZeneca, personal fees from Pfizer, personal fees from Eli Lilly, personal fees from Kyowa Kirin, and personal fees from Nippon Kayaku outside the submitted work.

#### REFERENCES

Bakouny, Z., Hawley, J.E., Choueiri, T.K., Peters, S., Rini, B.I., Warner, J.L., and Painter, C.A. (2020). COVID-19 and cancer: current challenges and perspectives. *Cancer Cell* 38, 629–646.

Fujiwara, Y., Sato, Y., Wang, X., Oikado, K., Sato, Y., Fukuda, N., Enokida, T., Takeda, K., Ohkushi, D., Hayama, B., et al.; COVID-19 Working Group of The Cancer Institute Hospital of Japanese Foundation for Cancer Research (2020). Screening for COVID-19 in symptomatic cancer patients in a cancer hospital. *Cancer Cell* 38, 609–610.

Liang, W., Guan, W., Chen, R., Wang, W., Li, J., Xu, K., Li, C., Ai, Q., Lu, W., Liang, H., et al. (2020). Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet Oncol.* 21, 335–337.

Lumbreras, B., Donat, L., and Hernández-Aguado, I. (2010). Incidental findings in imaging diagnostic tests: a systematic review. *Br. J. Radiol.* 83, 276–289.

O'Sullivan, J.W., Muntinga, T., Grigg, S., and Ioannidis, J.P.A. (2018). Prevalence and outcomes of incidental imaging findings: umbrella review. *BMJ* 367, k2387.

Pruis, M.A., Hussain, B., Bakker, M., Hoek, R.A.S., Miedema, J.R., Dingemans, A.C., and Paats, M.S. (2020). A lung cancer patient with dyspnea: diagnostic difficulties during the COVID-19 pandemic. *Cancer Cell* 38, 611–612.

Westblade, L.F., Brar, G., Pinheiro, L.C., Paidoussis, D., Rajan, M., Martin, P., Goyal, P., Sepulveda, J.L., Zhang, L., George, G., et al. (2020). SARS-CoV-2 viral load predicts mortality in patients with and without cancer who are hospitalized with COVID-19. *Cancer Cell* 38, 661–671.