

## Brief Opinion

## Radiation Therapy Care During a Major Outbreak of COVID-19 in Wuhan

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## Abstract

**Purpose:** The epidemic of coronavirus disease 2019 (COVID-19) challenges the prevention and protection of the cancer patients and the staff in the department of radiation oncology.

**Methods:** At the Hubei Cancer Hospital, we organized an emergency infection control team to lead special efforts to combat COVID-19 during this challenging time.

**Results:** Radiation therapy treatments were resumed on January 30th and have never stopped again at the hospital regardless of the circumstances of the ongoing outbreak. Between January 30th and the time of the writing, we have treated over 100 radiation therapy patients, with no incidence of on-site COVID-19 transmission between patients and health care workers in the duration.

**Conclusions:** Our experience will help guide the practice in other regions that are or might be facing outbreaks of this disease.

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In December 2019, cases of an unexplained new type of pneumonia started to appear in Wuhan, China. This was soon confirmed to be caused by a novel coronavirus (2019n-CoV).<sup>1</sup> The acute respiratory infectious disease caused by 2019-nCoV was later termed coronavirus disease 2019 (COVID-19). During the first month of the outbreak, there were 16,500 confirmed cases, 360 fatalities, and over 20,000 suspected cases in China, with the vast majority of cases in Wuhan.<sup>2</sup> With medical support from other regions of China and the world and after nearly 2 months of lockdown, the COVID-19 epidemic in

Wuhan seems to be under control, with new confirmed cases currently recorded at a daily tally in single digits. However, the epidemic has since spread internationally and is breaking out in many other countries across different continents. By March 11, 2020, the rapid spread of the virus had caused more than 118,000 cases and 4291 deaths in 114 countries. The World Health Organization declared that the epidemic of COVID-19 had become a “global pandemic.”

Radiation therapy is a mainstay treatment for patients with cancer and usually involves treatment delivered over days to weeks. Previous studies have reported that a protracted radiation therapy course or treatment interruption contributes to inferior local control and overall survival in patients with cancer.<sup>3,4</sup> It is a unique challenge to provide radiation oncology care to patients with cancer during such a major outbreak without radiation therapy interruption or protracted radiation therapy time. Infection

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**Figure 1** Example picture showing a radiation therapist in personal protection equipment (PPE) (gowns, N-95 masks, gloves, and protective eyewear) delivering radiation therapy treatment at the console.

prevention and control are critical both for this susceptible patient population with often compromised immune systems and for health care workers.

This article briefly reviews the radiation therapy management in Wuhan since January 2020, with the hope that the experience learned and the lessons learned will help guide practice in other regions that are or might be facing outbreaks of this disease.

In early January, because the hospitals in Wuhan were yet unclear about the disease outbreak, radiation therapy deliveries were conducted as normal at various cancer centers in Wuhan. Neither mask-wearing nor hand hygiene was enforced for patients or medical staff, and there was no regular disinfection of the linear accelerators. Around January 20, person-to-person transmission between patients and staff was reported at a tertiary referral (Grade A) hospital affiliated with a prestigious university in Wuhan. As a result, several radiation oncologists, 2 radiation therapists, and an unknown number of patients were infected with 2019n-CoV.

January 23, 2020 was Chinese New Year. Therefore, all radiation oncology centers in Wuhan had a planned closure with no treatment delivery until January 27. However, COVID-19 rapidly spread in Wuhan during the break. With no COVID-19 prevention guidelines prepared, most centers that reopened on January 27 stopped treating again after having resumed radiation therapy delivery for 1 or a few days because of more infections of patients and/or staff. The only hospital specializing in oncology in Wuhan, the Hubei Cancer Hospital, did not resume treatment on January 27. Instead, efforts were made to develop a COVID-19 prevention workflow and standards, to disinfect treatment vaults, and to design and develop appropriate isolation zoning. Thereafter, radiation therapy treatments were resumed on January 30 and have stopped again at the hospital regardless of the circumstances of the ongoing outbreak.

The COVID-19-specific practice guidelines we put in place are as follows:



**Figure 2** Example picture showing 2 radiation therapists in personal protection equipment (PPE) setting up a patient with glioblastoma with a modified thermoplastic mask immobilization device with a surgical mask underneath.

1. Patient screening: All patients receiving radiation therapy at our hospital must be screened for COVID-19. Only patients for whom COVID-19 has been ruled out can receive treatment.
2. Health education for patients: We developed a radiation therapy informed consent form. Before receiving radiation therapy, the patient is informed of the risk of cross-contamination during treatments and signs the informed consent. The patient is also informed of the zoning design of the radiation therapy center, the radiation therapy workflow during the outbreak, and the necessary personal protection for the patient.
3. Health care worker screening: According to the COVID-19 diagnosis guidelines, staff returning to work must be screened for the disease. Only those cleared by the screening can return to their posts.
4. Staff training: Before returning to their posts, staff receive training on COVID-19 prevention and protection. Staff learn the protection level of their corresponding role and the appropriate personal protection equipment for the role (a radiation therapist wearing personal protection equipment during treatment delivery is shown in Fig 1), as well as the dons and doffs.
5. Zoning: The radiation therapy center is zoned into different contamination levels (Clean Zone, Semi-soiled/Semi-contaminated Zone, and Soiled/Contaminated Zone) and is periodically disinfected following corresponding frequencies and protocols. The protection level needed for each zone level is clearly defined.
6. Special considerations for immobilization devices: Special modifications are put in place for certain immobilization devices during the outbreak. For example, surgical masks are used under the

thermoplastic mask for cranial or head and neck patients (Fig 2); single-use clear wrap is applied to immobilization devices.

7. A special radiation therapy treatment workflow is designed to avoid patient–patient contact and minimize patient–staff interaction time.

Between January 30 and the time of this writing, we have treated over 100 radiation therapy patients, with no incidence of on-site COVID-19 transmission between patients and health care workers in this duration. This suggests that the protection practice guidelines we put in place are effective and may be helpful for other radiation therapy centers.

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