RADIATION ONCOLOGY CASE

Radiation Therapy Continuation for a Patient Diagnosed with COVID-19 in a High-volume Radiation Oncology Practice

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CASE SUMMARY

This case report describes the case of a morbidly obese woman undergoing adjuvant radiation therapy for an adrenal cortical adenocarcinoma in a busy New York academic radiation oncology practice. In the middle of her 5-week course of treatment, she developed signs and symptoms suspicious of SARS-CoV-2 infection after a known exposure to a coworker diagnosed with the virus. She ultimately tested positive. After a brief hiatus in her course of radiation, she was able to complete her course of radiation therapy employing a strict protocol to be subsequently described in detail.

INTRODUCTION

COVID-19, the disease caused by SARS-CoV-2, is a novel coronavirus pandemic that has swept the world, with most cases now concentrated in Europe and the US. In the US, New York State has the highest number of confirmed infections. Approximately 15% of all infected patients require hospitalization and approximately 2% require intensive care unit (ICU) admission.[1,2] In some populations, up to 85% of confirmed infections are asymptomatic. However, the total fraction of New York's population that is infected is unknown as a result of limited testing capacity. The pattern that is emerging shows a higher likelihood of severe infections in the elderly, the immunocompromised, those with comorbid conditions, and healthcare staff that are exposed to a high viral load. The most common cause of morbidity and death in these patients is bilateral lung pneumonia and consequent inflammatory response to the infection.[3]

In the New York metropolitan area, the high density of infected persons increases the risk of exposure and transmission, including to immunocompromised cancer patients and the health care staff who care for them.[3,4] For this reason, beginning the second week of March 2020, our radiation oncology department implemented a policy of temperature and symptom screening at the building entrance, requiring masks for all staff and patients, limiting people in the building to staff and patients only, and utilizing gloves and face shields if patient examinations were absolutely necessary. It was after this implementation that our department had its first exposure incident to a COVID-positive patient undergoing treatment.

CASE

The patient is a 36-year-old healthcare worker with T1N0M0 adrenal cortical adenocarcinoma. She underwent robotic-assisted laparoscopic right adrenalectomy in January 2020. She was referred for consideration of adjuvant radiation therapy and was offered a course of intensity-modulated radiation therapy to 45 Gy in 25 daily fractions over 5 weeks, which she began

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on March 11. She was seen by medical oncology who planned to give her mitotane after radiation therapy. Of note, she takes hydroxychloroquine for rheumatoid arthritis.

TIMELINE OF EVENTS

The patient began radiation therapy on March 11. On March 17, our department nurse practitioner (NP) had a brief telephone interview with the patient prior to treatment that day. The patient was asymptomatic, afebrile and her vital signs were stable, but she stated she had close contact with a coworker who had developed a fever and tested positive for SARS-CoV-2 infection. The patient was instructed to come in for her usual treatment and follow all previously instituted safety protocols.

At this time, the patient's office was unsure of the next steps. She had not yet been contacted by her company's employee health department or by the New York State Department of Health. We asked her to let us know if/when she received additional guidance by these other entities. In the interim, our institution adopted a standard protocol for the patient to follow, based on Centers for Disease Control and Prevention (CDC) guidelines: All patients' temperatures would be checked prior to each treatment at a screening table set up outside the department entrance, and patients would be asked a series of screening questions. In addition, patients with known close contact would be asked to check their temperature twice daily, wear a mask in the building, and report any additional symptoms.

She was tested for SARS-CoV-2 on March 24 due to the prior exposure. After receiving her radiation treatment on March 25, she was placed under mandatory quarantine beginning that day per her employer's employee health department.

On March 26, we spoke with the patient on the phone. The patient reported a temperature of 100.9 degrees Fahrenheit later on March 25, for which she took acetaminophen 1g every 6 hours around the clock; her temperature decreased to the 99s. She developed a wet cough, productive of yellowish phlegm, and generalized body aches. Her breathing felt tight, though unlabored.

The patient's test returned positive on March 26. She was then placed on a treatment break while she remained symptomatic. Her fever resolved and most symptoms, including cough and body aches, improved; by March 29, only fatigue persisted. The patient resumed treatment on March 31. A repeat COVID-19 test for the virus was not performed as per the patient's employee health protocol. At the time of this writing, there were no accepted consensus guidelines to ensure safe re-initiation of radiation therapy after a documented COVID-19 infection. Once re-testing becomes universally available, this may very well become standard of care in determining when to resume radiation therapy. In the context of the above scenario, the CDC advises that facilities use the following criteria: "at least 72 hours have passed since recovery defined as resolution of fever without the use of fever-reducing medications and improvement of respiratory symptoms (eg, cough, shortness of breath), and at least 7 days have passed since symptoms first appeared."[5]

For the safety of radiation staff and other patients, infectious disease contact and droplet precautions were implemented through the duration of our COVID-19 infected patient's course of radiation therapy. Personal protective equipment (PPE) was worn by the treating radiation therapists and other clinical staff in patient contact. The minimum PPE included an N95 respirator with a surgical mask over it, eye shield, disposable isolation gown, and gloves. Staff additionally wore disposable hair covers and shoe covers. Staff were trained in PPE donning and doffing in a systematic manner as recommended by the CDC, and staff competencies were assessed and documented.

To minimize exposure, the patient was scheduled as the last patient of the day. Additionally, the patient was escorted into the department via a back entrance closer to the linear accelerator vault and left the department via the same route. The vault was closed for at least one hour before terminal disinfection by a specially trained cleaning crew.

As of April 6, the patient was tolerating adjuvant radiation therapy well without pain or gastrointestinal distress. She continued with her usual medications and laboratory surveillance. On this date, she reported a slight cough, anosmia and ageusia, but denied fever, shortness of breath or a rash. She also reported that her husband was recently hospitalized with bilateral COVID-19 pneumonia and was clinically improving.

Also on April 6, two weeks after diagnosis, the patient was advised by employee health to undergo evaluation for return-to-work clearance per CDC guidelines for infected health care workers. She did not undergo repeat testing. She was cleared to return to work and technically considered recovered and "noninfectious" on April 7. In an abundance of caution, contact and droplet precautions were continued in our department until the patient completed her course of radiation on April 20. Although a less stringent protocol of symptom and temperature check and wearing only a face mask was now technically permissible, we continued the prior protocol of donning the full PPE to minimize exposure risk and provide treating staff additional peace of mind.

DISCUSSION

Our experience of treating a radiation patient with a highly communicable, potentially deadly virus resulted in a well-coordinated, professional, and effective response. Not only do we have an obligation to care for our cancer

patients who have committed to a course of potentially life-saving radiation therapy, but we also have an equally critical obligation to keep other patients and staff safe and to minimize exposure to the virus. We were able to treat the patient on schedule while keeping our staff and other patients safe from infection. At first, the situation did cause considerable angst amongst the treating staff. We balanced real risks including affecting other patients and the small possibility of having to close our radiation facility if staff was impacted. We had to tread carefully and meticulously to honor our commitments to our patients and staff.

As an additional way to limit exposure to the virus, we have made a great effort to prioritize the treatment of various patients (urgent patients: normal timeline; semi-urgent patients: delay of 2 to 4 weeks; nonurgent patients: delay > 4 weeks) to decrease the census as a way of social distancing.[6] Moreover, we limit family or companions in the department, allowing the patient one person to accompany them only if essential for the patient's care. As we learn more about the nature of COVID-19, we have been able to adjust and refine our practices to minimize risk of exposure to our staff and other patients. In retrospect, the employee heath return-to-work policy was probably too aggressive and retesting, now more available, has been firmly incorporated into decision-making processes regarding when to return employees to work.

We have learned a few valuable lessons from treating a COVID-19 positive patient in our busy radiation oncology practice. We were comfortable exceeding PPE standards, particularly given the uncertainties of the virus as this provided the treating staff significant reassurance regarding adequate protection. We also appreciated the necessity of verifying the status of our patient vis-à-vis objective infectivity parameters from an official medical entity and not relying solely on the patient's account. At this moment in the pandemic, our knowledge has been increasing exponentially, which will no doubt result in our gaining control over COVID-19. That said, much remains unknown and, until then, we will exercise an abundance of caution.

CONCLUSION

Infectious pandemics are not unprecedented in the history of the world. However, the COVID-19 pandemic is arguably unprecedented in our lifetime, in particular in its sheer scale and its threat to lives, health, livelihood, and indeed our very way of life. We most certainly find ourselves on a wartime footing, requiring all hands on deck, and literally having to triage patients and priorities in, at times, an overwhelmed healthcare system. We have been forced to rapidly innovate policies and procedures (and be ready to modify them as necessary) to effectively and ethically deal with a multitude of challenging circumstances. In our department of radiation medicine, we have sought guidance from our health care institution through its Physician Partners Leadership who have drawn from national and global health leadership bodies such as the CDC, National Institutes of Health, and World Health Organization.[3] With the above-detailed case, we believe we have remained steadfast in our mission to care for our cancer patient safely even when afflicted with COVID-19. We feel having uniform policies and procedures across all of our many sites has allowed us to balance our competing obligations of keeping staff and patients safe from exposure to this highly transmissible contagion and delivering optimal oncologic care for our cancer patients.

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