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Commentary

Radiation Oncology Advancements in the Wake of the COVID-19 Pandemic

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ABOUT THE STUDY

The COVID-19 pandemic poses new challenges for many aspects of health care delivery, including diagnostic and therapeutic procedures in radiation oncology. The date of COVID-19 eradication is unknown, efforts to prevent the spread of COVID-19 and similar viruses are likely to continue. Magnetic Resonance Imaging (MRI) use in radiation oncology is one area that will most likely change as a result of the pandemic. National guidelines issued during the COVID-19 pandemic addressed MRI use in diagnostic radiology, with applications to radiation oncology. Many radiation oncology departments use RI for magnetic resonance linear accelerator (MR-linac) treatments and MRI simulations.

MRI is important in radiation oncology, with established applications in defining brain and spine targets for stereotactic treatments and facilitating image guided brachytherapy for cervical cancer. MRI simulation and MR-linac use have increased, and MRI is used for contouring and image guidance across a wide range of malignancies due to its superior soft tissue contrast compared to computed tomography, its lack of ionizing radiation, making it well suited for continuous imaging, and its ability to support online adaptive radiation therapy workflows with real-time tumor tracking. Single-institution prospective trials and multi-institution retrospective studies provide preliminary evidence for the value of MR-linac use in radiation oncology, but randomized trials are required to provide a higher level of evidence.

The financial impact of COVID-19 is expected to last after the pandemic, and higher levels of evidence will be required to justify the acquisition of often expensive MRI simulators and MR-linacs in radiation oncology. Although the need for evidence-based medicine has always existed in our field, the pandemic is expected to increase this demand. Randomized trials establishing a broader role for the MRI will be critical for a device that is both costly and incorporates a strong magnetic field that poses a risk to vulnerable categories. The number of available employees in health care facilities may decrease in the aftermath of COVID-19. Personnel allocation may be re-evaluated to reduce room occupancy and, where possible, maintain a safe distance between staff and patients. The use of MRI in radiation oncology necessitates the collaboration of a multidisciplinary team of personnel, including physicists, technologists, physicians, and nurses. Multidisciplinary team training can include off-site and virtual simulations to reduce the number of clinic employees in the post pandemic world. This is especially important in MR-linac training, where radiation therapists frequently benefit from radiology cross-training with magnetic resonance technologists.

To ensure safe MRI delivery, post pandemic MRI growth will require cross-institutional collaboration. The risks of MRI are related to the high magnetic fields used in the procedure, which are not seen in other areas of radiation oncology. The MRI environment necessitates special considerations for the safety of items entering the scanner room. The COVID-19 outbreak has also made health-care providers more aware of the possibility that even asymptomatic patients may be carrying viruses that can be transmitted through droplets that can linger in the air for a few hours before falling on nearby surfaces.

Patients are required to wear face masks continuously throughout the examination and treatment procedure to reduce potential transmission to people who enter the scanner room later. During the COVID-19 outbreak, Personal Protective Equipment (PPE) such as face masks, respirators, face shields, goggles, and gowns emerged as an additional risk factor for the MRI environment. Following the pandemic, continued consideration of the safety of MRI PPE will be required. Using a ferromagnetic detector or a portable magnet, PPE and any devices accompanying the patient should be tested for ferromagnetic components. Replacement of ferromagnetic components is required.

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