

# The implications of COVID-19 in radiation oncology in the United States

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The corona virus disease of 2019 (COVID-19) has been traumatic. The universality of the problem has been unique, engaging a rare movement of shared global burden. In the wake of the pandemic, the pillars that sustain the U.S. health care system have been aggressively challenged at all levels, forcing a reluctant evolution from the status quo in many cases. In many ways, the impact of the pandemic on radiation oncology has been predictably similar to the impact on other medical specialties; in other ways, it has been unique, providing novel opportunities for health policy changes and adaptations.

The requirement for physical distancing initially placed a significant burden on daily operations. The modus operandi of a radiation treatment facility is such that each step of the patient's experience requires close proximity. For instance, a patient with breast cancer requires a thorough physical exam in both the supine and sitting positions at the time of initial consultation. At the point at which computed tomography simulation is warranted for radiation planning, a team of radiation therapists of necessity physically position the patient, adjusting and readjusting to ensure both comfort and precision. Those mandatory positional accommodations are repeated daily during the course of treatment. Consequently, silent sacrifices have been required of the radiation oncology staff, particularly during the early days of the pandemic when there was simply more uncertainty and fewer resources.

However, the relationship between adversity and innovation has also been on full display, as novel approaches to health care have emerged to strengthen and preserve the quality of health care delivery. Notable among them have been the customization of radiation treatment timelines, the implementation of advanced audiovisual technology, and the exploration of innovative treatment approaches with radiotherapy for the treatment of patients with COVID-19.

## Hypofractionation

Cancer is typically a disease of elderly individuals, and unsurprisingly, the most vulnerable target of this pandemic disease has also been elderly individuals<sup>1</sup>. The dilemma for the radiation oncologist has been to balance the risks associated with a patient's daily visits to the radiation treatment facility (a potential incubator of pandemic pathogens), and the patient's need to undergo life-saving treatments. In offering a *modus vivendi*, some radiation treatments have

been "hypofractionated" as a means to deliver effective treatment over a much shorter period of time<sup>2</sup>. The compromise inherent in that approach is that higher doses are delivered per treatment, producing a somewhat higher toxicity profile than the standard dose in some cases.

The concept of hypofractionation has not been unique to the COVID-19 period. The field of radiation oncology has been organically moving toward hypofractionated regimens over the last several years<sup>3</sup>. The long-term effects of the shortened treatment schedules, if they continue to prove their equivalence to conventional treatment after long-term follow-up, will be a dramatic improvement in quality of life for millions of oncology patients who will undergo radiation treatments as part of their disease management.

## Economics

In the current reimbursement model, the number of radiation treatments a patient undergoes affects the extent of a physician's remuneration, with more treatments generating greater profits for the physician and the affiliated radiation oncology department. Although the option of short-course compared with long-course radiotherapy treatment is ultimately determined by the clinical scenario, some friction between economics and conscience will invariably occur on occasion. Indeed, that friction is particularly pertinent today, during the COVID pandemic, when several health care systems have been hemorrhaging financially, and monumental losses have threatened the solvency of some health care institution. The pull of economics might also affect the present setting, in which some physicians might not have met their minimal "relative value units" target because of postponed patient treatments as a consequence of the pandemic.

Given all those financial stressors, there appears to be no indication that the tide toward hypofractionation will be stemmed in favour of monetary incentives in radiation oncology. The continued commitment by many radiation oncologists to place patients over profits at our institution and in other locations has been inspiring. Those efforts follow the excellent example of patient-centric care modelled by the late Dr. Norman Nigro (1912–2009), a surgeon, whose efforts changed the treatment paradigm in advanced anal cancer from a surgically-based approach to nonsurgical management<sup>4</sup> in spite of the inherent financial detriment to surgical practice.

## Telemedicine

Another area that has been affected by the COVID-19 pandemic is the connection between health care providers and patients. The desire to shield patients from exposure to COVID-19 has naturally necessitated the rapid expansion of telemedicine in radiation oncology.

In the early days of telehealth, the first few instances of turning on the camera for a patient visit were understandably riddled with errors, Internet bandwidth fickleness, and questions about security. As telehealth infrastructure has been implemented in our clinics, and as time and practice have streamlined the process, it has become apparent that telemedicine as a health care delivery modality has been greatly underused in the radiation oncology sphere.

Several large health care systems, including the institution of our current employment, receive countless consultation visits from patients living in different states or from in-state residents commuting more than 2 hours to the facility. Many of those long-distance visits are solely for the pursuit of second opinions from disease-site experts—typically after the patient has received treatment recommendations from facilities closer to home. In most cases, those patients do not have the ability to place their domestic lives on hold and to move to a distant and expensive metropolitan area for weeks to undergo treatment, even with financial assistance from insurance companies and the host institution. Many of the second-opinion-seeking patients, especially those for whom an actual physical exam adds little clinical value to the wealth of accumulated workup data, can be screened for appropriateness by telehealth visit.

The same paradigm holds true for low-risk patients who require follow-up visits in the radiation oncology department—particularly those who have been seen recently by another oncology physician at the same institution and whose appointments are scheduled merely for a review of new radiographic imaging. Such patients, undergoing a burdened cancer journey that is riddled with challenges from geographic distance, age, or comorbidities, will certainly benefit from carefully implemented telehealth opportunities, even if the option of a telehealth visit is offered only intermittently.

The major determinant of success for a telehealth program in radiation oncology will be the posture of the Centers for Medicare and Medicaid Services. Before the COVID-19 epidemic, reimbursement for a telehealth visit was much lower than that for an in-person clinic visit. As the pandemic has spread and placed limits on the capacity and functionality of health care facilities, reimbursement for telehealth visits and in-patient visits in radiation oncology have been adjusted to become nearly equivalent<sup>5</sup>. The likelihood of continued equivalence in the post-pandemic era is unclear and unlikely. However, the lesson learned is that telehealth, with all of its limitations, is a tremendous resource in radiation oncology and its incorporation into the health care framework will lift significant burdens from patients.

## Radiotherapy

Recently, the interplay between the COVID-19 pandemic and radiotherapy has been magnified, given that radiotherapy is currently under exploration as a possible treatment for SARS-CoV-2. The rationale for such an exploration stems from

early 20th century literature demonstrating the high efficacy of radiotherapy in treating pneumonia<sup>6</sup>. In the current setting, low-dose radiotherapy treatments are being investigated as a means of decreasing the inflammatory and cytokine storm effects of COVID-19<sup>7</sup>. Further investigations in that domain continue as clinical trials at our institution and others evaluate that treatment paradigm.

At 29 July 2020, our institution was the first in the world to use low-dose radiation to treat an intubated patient with COVID-19. In the event that favourable outcomes are reported in such patients, a much-needed educational initiative will invariably be needed to dispel current myths surrounding radiotherapy and to educate the general population about the evidence-based merits or side effects of treatment. Such a scenario will undoubtedly be challenging, but will be critically needed.

## SUMMARY

The COVID-19 pandemic has been a disrupter in the radiation oncology domain, but it has simultaneously provided a stimulus of opportunities. New opportunities for telemedicine and hypofractionation have been novel and inspiring. Additionally, the potential application of radiotherapy as treatment during the current pandemic provides hope for symptomatic patients with COVID-19. The unsolicited tutelage of the pandemic will ultimately reshape current policy decisions and the practice of radiation oncology in the years to come.

## CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology's* policy on disclosing conflicts of interest, and we declare that we have none.

## AUTHOR AFFILIATIONS

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