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Letter to the Editor

A Call for a Radiation Oncology Model Based on New 4R's During the COVID-19 Pandemic

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We are in the midst of an unprecedented crisis worldwide. Since the first reports in China on December 31, 2019, coronavirus disease 2019 (COVID-19) infections have spread extensively across the globe. As of April 4, 2020, >1,100,000 cases and >60,000 deaths have been reported worldwide.[1] These numbers continue to increase exponentially and the health care system is strained to the maximum. Immunocompromised and elderly individuals are susceptible to COVID-19 with a higher risk of mortality.[2] Data show an aggressive course of COVID19 and >3 times a higher risk of death in patients with cancer.[3] The health care system is under enormous pressure to deal with this constantly changing and ever-evolving crisis. Several countries and provinces are reallocating resources and prioritizing available options in this emergency. Radiation oncology is an integral part of cancer care and expected to face significant challenges in the coming weeks as COVID-19 continues to impact our lives.[4–6]

Classic radiation oncology is based on the 4 classic R's: repair, reassortment, repopulation, and reoxygenation. During the COVID-19 pandemic and global emergency, we suggested a radiation oncology model based on 4 new R's to mitigate the impact of the current pandemic on patients and cancer centers.[7] The new 4R's are remote/virtual care (ie, reduce in-person consultation/follow up/treatment visits), ration radiation (ie, offer radiation wisely and avoid radiation therapy with minimal benefit), rational deferring of radiation (as appropriate), and reduce fractions/hypofractionated radiation (where applicable).

Significant emphasis is placed on minimizing in-person visits for patients, and several Canadian provinces have adopted remote/virtual care as a standard model during the current emergency.[8] Remote/virtual care helps minimize patient visits to the hospital and thus the risk of infection.

Radiation oncologists should wisely ration radiation and avoid radiation in cases where there is minimal or questionable benefit. Favorable ductal carcinoma in situ[9] (ie, mammographically detected, <2.5 cm in size, low-intermediate grade, and adequate resection margins), favorable low-grade invasive breast carcinoma[10] (age ≥70 years, primary ≤3 cm with negative resection margins, estrogen receptor positive, node negative, and eligible to receive hormone therapy), and low-volume favorable intermediate-risk prostate carcinoma[11] may be appropriate for active surveillance. There are several potential scenarios where avoiding radiation should be strongly considered.

We should also diligently assess options of rational deferring of radiation as appropriate based on the clinical scenario. Ductal carcinoma in situ and invasive breast carcinoma could be safely delayed up to 12 weeks.[12–14] Favorable intermediate-risk prostate cancer and unfavorable intermediate-risk prostate cancer could defer radiation for 3 to 4 months or longer. Androgen deprivation therapy could be used as a temporizing measure for radiation deferral in appropriate cases, such as unfavorable intermediate-risk and high-risk prostate cancer.[15,16]

In these unusual times, the use of reduced fractions/hypofractionation regimens is strongly recommended.

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Before COVID-19, the use of hypofractionated radiation was highly variable across the world for various reasons despite supportive data. There are enough data to practice this regimen safely for common cancer sites, such as as the prostate, breast, rectum, lung, and even palliative situations.[7,17–22] The use of hypofractionated and ultra-hypofractionated radiation could save potentially 10 to 20 visits and thus lower the risk of infection and even mitigate the risk of treatment breaks and allow for radiation facilities with reduced manpower. With the expected resource and manpower constraints, this model is gaining popularity.[23] A clinical scenario where boost radiation adds minimal benefits to the outcomes is also another potential opportunity to reduce the number of fractions.[24,25] Judicious resource allocation is paramount and hypofractionation regimens serve a vital purpose.

We used this model and proposed thoracic cancer-specific provincial consensus.[7] Prostate and breast cancer-specific radiation guidelines were recently proposed.[16,23] The new 4Rs-based model framework could help several other disease site group designs and use site-specific policies. The framework would also help the global radiation oncology community use constrained resources efficiently, function and fight better, and ultimately flatten the curve of the COVID-19 pandemic. May we all emerge victoriously.

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