Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Commentary

Digital healthcare and shifting equipoise in radiation oncology: The butterfly effect of the COVID-19 pandemic

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The COVID-19 pandemic represents a significant disruptor in radiation oncology practice. COVID-19 has altered oncology workflow, patient care, medical education and research. We reflect on important considerations and examine the evolving changes across the oncology landscape affecting all medical radiation technologists.

Evidence-based medicine (EBM)

Radiation oncology practices have always been led by EBM and clinical trials results. This approach is well practised where there is a sufficient evidence base available and competent interpretation of such evidence. The COVID-19 pandemic challenges this by exposing many unknowns and knowledge gaps. Initial small case series from China showed possible increased risks to cancer patients[1] and significant oncology practice changes were implemented based on this in an abundance of caution by clinicians expecting healthcare disruptions.[2,3] Subsequent emerging prospective cohorts has shown COVID-19 mortality is significantly linked with increased age and morbidities but on multivariate analyses not able to conclusively link COVID-19 to increased mortality while on anti-cancer treatments due to short follow up data.[4,5]

All practitioners must recognise uncertainties in making treatment decisions with cancer patients during the COVID-19 pandemic.[6] The key questions are (1) what is the risk of contracting COVID-19 while having treatment and (2) what is the risk of mortality of cancer patients on treatment and contracting COVID-19.[3] Radiation oncologists should now routinely discuss the concept of morbidity and mortality with patients. Early discussions of the aims of treatments, risk of severe morbidities (however small) and risk of mortality (small but ever present) is mandatory before considering treatments. The uncertainties of COVID-19 will shift the equipoise in treatment decisions towards more caution and avoidance of over-treatment. Close discussion with patients is essential if interventions offer minimal benefits in the adjuvant and palliative settings.

Paradoxically, for certain cancer sites such as oesophageal and bladder cancer, COVID-19 has resulted in increased rates for non-surgical treatment options with chemotherapy and radiotherapy due to suspension of radical oncological surgery. Therefore, radiation oncologists must be able to consider the whole anti-cancer treatment pathway and formulate individualised treatment plans.

The lesson from this pandemic is that all practising medical radiation technologists must retain the ability to appraise the scientific literature. As an oncologist making clinical decisions, this comes with the responsibility of being able to understand the underlying evidence and recognising areas of uncertainty. Changes in routine practice by technologists must also be guided by evidence.[6] Professional bodies of technologists should establish committees to provide guidelines to practitioners in the rapidly evolving COVID-19 pandemic, but individuals should have agility to react to changing local circumstances.[7,8]

Hypofractionation in radiation oncology has been shown to be iso-effective for major cancer sites.[9] However, adaptation has been gradual, with delays in technical advances and logistical impediments.[10] COVID-19 will trigger a shift favouring lesser visits of radiotherapy, greater chances of treatment completion, and safer care.

Digital healthcare

COVID-19 should trigger all medical radiation technologists to review their workflow. Significant healthcare changes have been introduced to prioritise cancer care and mitigate

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risks of disease transmission.[3] Therefore, every patient encounter should be maximised for clinical effectiveness and justify the risks of potential exposure to COVID-19.

Innovative and pragmatic technological solutions should be adopted by medical radiation technologists. Patient consultation can be facilitated with telemedicine and virtual clinics. New models of health incorporating online patient reported outcomes has been shown to improve patient care and could be used to reduce visits in delivery of chemotherapy or radiotherapy.[11] Clinical activities of technologists that do not require patient contact should be facilitated remotely if possible, such as radiotherapy planning and routine follow up clinics.[12] The logistics and legal framework to support remote consenting for medical procedures should be explored.

Novel oncology workforce deployment should be introduced with prioritising cross-covering duties, particularly in small radiotherapy centres and highly specialized advanced radiotherapy techniques with a small workforce of radiographers, physicists, or clinicians.[8] Collaboration with sister centres allows a back up and clinical support to avoid service disruptions. Quality assurance and regular review of the oncology pathway for clinical effectiveness should be conducted. Mitigating risks by identifying possible weaknesses to the oncology workflow most vulnerable to service disruption and leadership roles in providing mitigating strategies should be allocated. Good practices demonstrated effective should be shared widely and adapted to local radiotherapy set-up among clinicians, radiographers, and physicists.

There will be significant effects on medical education of the future generation of medical radiation technologists.[13] Education of medical students, radiographers and trainee technologists all benefit from patient contact. The use of simulation sessions, virtual clerkships and alternative assessment of clinical examination skills will need to be explored to facilitate this safely. Input from stakeholders involved is essential and objective measurement of success and feedback loop to develop these new models of education delivery is also essential.[14] Virtual conferences that have been adopted during the COVID-19 pandemic have been effective in providing continuing professional development and medical education. Post COVID-19 conferences should feature hybrid type conferences with a mix of virtual and physical attendees. Webinars would allow sharing of medical knowledge to international communities. Virtual conferences would also contribute to lowering the carbon footprint by reducing air travel. Good practices, innovation and precautions that work should be shared with the global community.[15] Pastoral care and support networks need to be established for our junior colleagues and fellow students and are essential to maintaining mental health and physical well-being during this difficult time.[11]

Challenge of the century

The oncology community, previously heavily dependent upon large-scale clinical trials in order to guide practice, have decided to suddenly change practice with only limited case series reports. This is understandable for the next few months at least until there are effective vaccines for COVID-19. Yet, all current cancer treatment trial recruitment and results will be skewed to the null hypothesis due to the competing risk of COVID-19 mortality. Real world data and urgent oncology research questions need to be answered with global oncology community collaboration to inform changes in oncology practice. Global oncology collaboration and international clinical trials continue to be important and should be supported by all oncologists, radiographers and physicists.

COVID-19 will be a defining moment for global healthcare. Technologists, physicists and clinicians need to be agile, adaptive and effective in the face of the pandemic. There are lessons to be learnt from this pandemic and effective mitigation strategies should be shared within the radiation oncology community for the benefit of our patients.

Uncertainties remain and great challenges are faced by the radiation oncology community and patients. In chaos theory, the butterfly effect refers to small early changes that can often translate to significant long-term consequences. COVID-19 as a small nanoparticle has managed to influence generational changes and trigger global event changes permanently, a reminder of our vulnerability. It is our duty as technologists living though this historic event to be guided by emerging evidence, retain solidarity amongst oncologists and heed the patient voice to reshape a better radiation oncology of the future.

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