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Editorial

The next generation of radiation oncologists: Challenges and perspectives

1. Introduction

The field of oncology has undergone many changes in the last few years and due to the ever-growing complexity of the discipline it is imperative that specialists receive extensive training, and for this reason training programs in radiation oncology are among the most comprehensive of all specialties. Oncologists require wide-ranging training in basic science as well as in clinical medicine. These specialists need to know how to manage the side-effects of systemic treatments and radiotherapy, and even surgery. All specialists working in oncology must also be prepared to use a therapeutic approach to patient care that involves collaborative efforts, working together with other specialists through multidisciplinary tumor boards.¹

In the speciality of radiation oncology, rigorous preparation is becoming even more important due to the emergence of new diagnostic and therapeutic strategies. In recent years, new technologies have revolutionized the field: intensity-modulated radiotherapy (IMRT), volumetric-modulated arc therapy (VMAT), image-guided RT (IGRT), and stereotactic body RT (SBRT).^{2,3} Importantly, some of these techniques are even capable of achieving results comparable to those traditionally obtained only through surgery.^{4–6}

As a result, it is essential that we encourage young radiation oncologists to constantly make efforts to develop their knowledge and skills in the three fundamental areas of the field: basic research, clinical knowledge, and technical understanding.

2. Basic research: method, environment, and opportunity. Are we ready?

The interdisciplinary approach to clinical challenges has greatly improved the therapeutic window for our patients.^{7–9} However, it is becoming increasingly common for clinicians to encounter intricate problems that require a comprehensive understanding of complex molecular mechanisms.¹⁰

Recently, the results of a survey administered to researchers attending an interdisciplinary research training program for graduate students entitled “Excellence in Radiation Research for the 21st Century” were published.¹¹ The study was carried out by the University of Toronto in collaboration with other international partners (Stanford University in the United States and Oxford University in the United Kingdom), and the aim was to assess the program’s impact on the scientific output of the participants (e.g., papers, patents) and also to evaluate participants’ perception of the program. The results were impressive: 90% of respondents were first authors of one or more articles, more than 50% had obtained research grants, and 16% had obtained patents for their work. In terms of skills acquired, most of the mentors surveyed agreed that participants had acquired essential skills in communication (84%), research (63%), and manuscript writing (47%).

As the Toronto study clearly demonstrates, education is an essential part of acquiring a broad understanding of all aspects in the field of oncology.¹² This finding should stimulate us—young, responsible oncologists—to reflect on and look for solutions that can help to improve the quality of our own training and that of future generations. Understanding the scientific method and applying that philosophy in our clinical practice is crucial if we are to produce more basic research. To do this, however, we must be willing to open the door to continuing education; doing so will allow us to establish a bidirectional flow of information between basic research and clinical practice.

3. Clinical knowledge

The main objective of a training program for radiation oncology residents should be to create an educational atmosphere that permits trainees to develop a comprehensive understanding of the multiple facets of the speciality: prevention, diagnosis, treatment, follow up, and palliative care and support.¹³ In addition, it is essential that future specialists learn the importance of a multidisciplinary approach

involving decision-making in the context of an interdisciplinary team. Interestingly, as far back as 1991 the ESTRO emphasized the importance of an interdisciplinary approach in a paper entitled “The European core curriculum on radiotherapy”.¹⁴ That document, which described the fundamental knowledge and skills that all specialists in radiation oncology should possess, was recently revised and updated to reflect the rapid progress and changes that have occurred in the field over the last two decades.^{15,16}

All radiation oncologists must understand the interaction between concomitant radiotherapy and systemic agents, and this must continue to be an important part of formal training programs for future specialists. Radiation oncologist need to fully understand how to manage the side-effects and toxicity associated with these inter-related treatments.

The curriculum for training programs in radiation oncology must also include specific instruction in radiobiology and molecular biology to help provide a better understanding of these fundamental aspects of the speciality in order to provide specialists with a comprehensive understanding of how radiation interacts with human tissues in the context of concomitant treatment with drugs.

4. Technical knowledge

In the last decade, the technological progress achieved in radiation oncology has been stunning, resulting in a remarkable increase in the variety of treatment techniques. Unfortunately, the training period for residents is limited and so we must focus on the most essential skills needed in radiotherapy: definition of organs at risk and target volumes, and evaluation and approval of treatments with IMRT, IGRT, and SBRT. For the newer generation of oncologists, such technologies are (or will soon be) the norm, and so it is crucial to have a strong understanding of these.

The foundation of both clinical and technical knowledge is an evidence-based approach. This approach underlies the decisions that are made by multidisciplinary tumor boards, and it is also the driving force behind the development of the international treatment guidelines that we use in our daily practice.¹⁷

The European core curriculum should serve as a uniform framework through which we can prepare future specialists in the competencies described in the preceding paragraphs. Moreover, such a framework would facilitate assessment of the diverse training standards currently in place at different international centers. A common framework would also make it easier to carry out exchange programmes, thus allowing European specialists to spend time learning and exchanging ideas with each other.¹⁸

5. Current challenges and conclusions

Given the rapid advances in knowledge and technology in recent years, it is conceivable that a newly graduated specialist could find that the material learned just two years prior may have already become obsolete. As a result, it is essential that all specialists possess the capacity to adapt to changing

circumstances, thus implying that they must also have a strong dedication to continuous learning. This ability to adapt is only possible if the oncologist is motivated and truly believes that innovation is the answer to new challenges. In our view, the key to successfully confronting difficulties is a willingness to think outside the box and to challenge outdated modes of thinking.

Nevertheless, the challenges currently facing us are not only to try to keep up with the latest research findings, but also to delimit the competencies of all the oncological specialities in order to avoid confrontations that could prevent us from working together in a shared, multidisciplinary spirit of collaboration.¹⁹

In short, we strongly believe that young radiation oncologist should have an open, active, and entrepreneurial attitude toward the challenges of daily clinical practice.

The result of these convictions and the dedication of many young oncologists to the field can be seen in the papers published in this special issue, in which numerous young colleagues who have completed their residency in the recent past (<10 years of clinical practice) present their research, their experiences, and their particular vision of our speciality.

In this issue, the reader will find scientific research papers whose strong scientific level is readily evident. There are papers by young specialists who present their experiences and initiatives, and readers will also find an important review paper on how we can take advantage of new technologies to make our clinical work even more useful and effective.

In a world of *constant progress* the driving force for *change* must arise from ourselves if we wish to be more than just mere spectators. This issue of RPOR is an important part of that driving force.

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