

## The promise of stereotactic body radiotherapy – next phase of integration into oncological practice

Stereotactic body radiotherapy (SBRT) or stereotactic radiosurgery (SRS) is at an inflexion point in its development and widespread adoption. Over the past decade, by leveraging technological advancements in motion management, on-board imaging and beam delivery, SBRT has become a key element in the management of many tumour types. This started with the targeting of small volume early stage disease resulting in excellent outcomes and increasingly in the oligometastatic and metastatic setting as our approach to these patients continues to evolve. This has generated great optimism and at the same time, significant pressure to replicate these early successes in more tumour types and disease states. Fortunately for us, exciting developments in recent times and on the horizon present many opportunities. It is therefore fitting that the *Chinese Clinical Oncology* chose to dedicate a special issue on SBRT to not only review the current utilization of SBRT in oncological practice, but more importantly, to highlight key developments on the horizon which will shape clinical implementation and practice.

First, on the technology front, the introduction of digitally controlled linear accelerators with multiple feedback mechanisms provides an automated solution for treatment centres where technical expertise and quality assurance know-how is limited, thereby improving access to SBRT treatments. Emerging beam delivery techniques including  $4\pi$  beam delivery, robotic X-band linear accelerators with high definition MLC systems and continued improvements in particle beam technology allow improved dose modulation and critical organ sparing with greater efficiency. At the same time the high-field strength, integrated MR linear accelerators that have emerged deliver real-time, improved soft tissue imaging, possibly layered with biological information, which could facilitate adaptive treatments in the future (1).

Second, complementing this improved precision in radiotherapy delivery is the promise of biological precision in an era of personalised medicine. Recent large scale molecular profiling efforts have redefined the molecular taxonomy of many cancer types and unveiled unique biological signatures which may explain inter-individual differences in response to radiation. This could enhance clinical stratification for treatment selection and dose intensification moving forward, forming the backbone of new clinical trials to deliver better outcomes for patients (2).

Third, while the immune modulating effects of SBRT have been known for a while now, the immunogenic response to radiation alone is seldom able to trigger a systemic abscopal response. The recent emergence and adoption of checkpoint inhibitors in the metastatic setting of various tumour types has delivered encouraging results but response rates remain low and immune escape leading to treatment failure remains a significant problem. In this regard, the combination of SBRT with immune-modulating treatments may be synergistic and generate a more powerful and persistent systemic response. Issues pertaining to the quality and type of immunogenic response as well as biomarkers to predict response are complex but will be the subject of investigation in many on-going clinical studies (3).

On the background of these three key developments, new approaches are being explored. At the same time, efforts to push the boundaries of existing clinical indications continue. These include the use of SBRT in early stage renal cell carcinoma and adrenal metastases (4), spinal metastases in the post-operative setting (5), early stage node negative lung cancer in medically operable patients (6), multiple brain metastases for dose escalation and preservation of neurocognition (7), aggressive treatment of oligometastatic disease (8), re-irradiation of various sites in the recurrent setting (9) and as a more efficient, cost effective way for dose escalation in prostate cancer (10). Having said that, such widespread and fervent adoption of SBRT is not without challenges. For one, imaging changes following SBRT can be very different from appearances post-conventional radiotherapy (11) and this will only get more complicated as combinatorial approaches with novel therapeutics and immunotherapies are utilised. Any treatment centre seeking to adopt SBRT in clinical practice should also be mindful of the demand for technical expertise and the need to assemble a specialised multidisciplinary team as well as establish process pathways before such care can be delivered in a safe and efficient manner. This is especially true in hepatocellular carcinoma for which there is increasing evidence that combination or sequential treatments with other modalities result in better outcomes and therefore patient selection for the optimal treatment strategy is paramount (12).

In this special issue of *Chinese Clinical Oncology*, we have solicited reviews from a panel of international experts to lend their

insights into the exciting advances mentioned above. We trust that the reader will find these insights useful as they navigate this evolving domain in their oncological practice.

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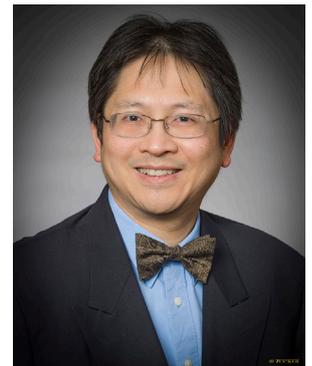
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