

The role of stereotactic body radiotherapy (SBRT)

By Kalli Spencer

SBRT is a form of radiotherapy that is delivered at a higher radiation dose per day but over a shorter period of time, 4-6 sessions versus 20-45 sessions (conventional external beam radiation therapy). The radiation dose is precisely targeted to the area containing cancer in a small number of fractions (hypofractionation) thereby avoiding surrounding structures and reducing toxicity. In the initial session a team of experts that include radiation oncologists, radiation therapists and medical dosimetrists can plan with precision how the dose can be most accurately delivered. Sometimes three small metallic markers (fiducial) are inserted into the prostate so the team can track exactly where the prostate is, especially as it moves with normal breathing. A high-resolution CT scan (simulation scan) is done after the markers are placed which helps to formulate the final customised radiation plan. The image-guided radiotherapy (IGRT) is then delivered with an advanced linear accelerator. The CyberKnife is a robotic system that uses artificial intelligence to deliver precise doses of radiation with extreme accuracy in select circumstances.

Endorectal devices

These devices are used to control the movement of the prostate and the rectum, either by fixing the rectum or by separating it from the prostate, decreasing the exposure of the rectal wall to high radiation dosages. Some examples of these devices are the endorectal balloon, hydrogel spacer and rectal retractor.

Localised prostate cancer

SBRT has demonstrated a favourable disease control and safety profile in several studies for low risk and intermediate risk localised prostate cancer as a definitive primary treatment¹. It is a recommended treatment option in multiple Uro-Oncology guidelines (ASTRO/ASCO/AUA).

Metastatic prostate cancer

Patients who have less than five metastatic deposits (oligometastatic disease) may be amenable to SBRT. This treatment is also known as metastasis-directed therapy (MDT). The aim of SBRT in this clinical setting is not only to eradicate malignant secondary lesions, but also to prevent further metastatic development and delay subsequent treatment escalation. It may also delay the progression to a castrate-resistant state. It has been shown that the maximum efficacy in terms of biochemical progression free survival is obtained within the first 6 months after treatment². This oncological advantage is still maintained at 24 months for a significant proportion of patients.

Studies are underway to assess whether in the future SBRT may be given alone but for now it usually given with systemic therapy (androgen deprivation therapy)³. The biological rationale behind MDT effect relates to the prevention of disseminated

subcellular clones from metastatic sites to the rest of the body improving oncological outcomes, treatment-free survival and thereby creating a positive impact on quality of life. The benefits of MDTs can be higher than those of ADT, particularly in patients wishing to delay systemic treatments for quality of life or comorbid illness concerns. There may also be an economic benefit.

Research in this area is ongoing.

Salvage therapy

In a meta-analysis by Valle et al. SBRT has been shown to be an effective management option for those who have disease recurrence after receiving radiation as the initial treatment for localised prostate cancer⁴. It may also be used as a salvage therapy to the prostate bed for disease recurrence after a radical prostatectomy.

Future trials should address the use of SBRT in different clinical scenarios providing more information about total treatment dose, fractionation, combination therapy with ADT and lymph node irradiation.

References

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About the Author

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Kalli is an internationally renowned Urological Surgeon, specialising in oncology and robotic surgery. He trained and worked in South Africa, before relocating to Australia where he has worked at Macquarie University Hospital and Westmead Hospital. His passion for what he does extends beyond the operating room, through public health advocacy, education and community awareness of men's health, cancer and sexuality.

Kalli has been involved with the Prostate Cancer Foundation of Australia for many years, advocating for improved cancer care and facilitating community prostate cancer support groups.