



OPEN ACCESS

EDITED AND REVIEWED BY
Timothy James Kinsella,
Brown University, United States

*CORRESPONDENCE

Amar U. Kishan
aukishan@mednet.ucla.edu

SPECIALTY SECTION

This article was submitted to
Radiation Oncology,
a section of the journal
Frontiers in Oncology

RECEIVED 02 September 2022

ACCEPTED 12 September 2022

PUBLISHED 17 October 2022

CITATION

Kishan AU, Kaminski J and Alongi F
(2022) Editorial: Stereotactic body
radiotherapy for prostate cancer.
Front. Oncol. 12:1034987.
doi: 10.3389/fonc.2022.1034987

COPYRIGHT

© 2022 Kishan, Kaminski and Alongi.
This is an open-access article
distributed under the terms of the
[Creative Commons Attribution License](#)
(CC BY). The use, distribution or
reproduction in other forums is
permitted, provided the original
author(s) and the copyright owner(s)
are credited and that the original
publication in this journal is cited, in
accordance with accepted academic
practice. No use, distribution or
reproduction is permitted which does
not comply with these terms.

Editorial: Stereotactic body radiotherapy for prostate cancer

Amar U. Kishan^{1,2*}, Joseph Kaminski^{3,4} and Filippo Alongi^{5,6}

¹Department of Radiation Oncology, University of California, Los Angeles, Los Angeles, CA, United States, ²Department of Urology, University of California, Los Angeles, Los Angeles, CA, United States, ³Department of Radiation Oncology, University of Tennessee Health Science Center, Memphis, TN, United States, ⁴Department of Radiology, Memphis Veterans Administration Medical Center, Memphis, TN, United States, ⁵Advanced Radiation Oncology department, IRCCS Ospedale Sacro Cuore Don Calabria, Negrar di Valpolicella (Verona), Verona, Italy, ⁶Department of Radiation Oncology, University of Brescia, Verona, Italy

KEYWORDS

prostate SBRT, prostate, active surveillance, spacer, MRI

Editorial on the Research Topic:

Stereotactic body radiotherapy for prostate cancer

Over the past few years, there has been an enormous growth in the strength of data suggesting the safety and efficacy of stereotactic body radiotherapy (SBRT) for prostate cancer. These include long-term data on ultrahypofractionated radiotherapy delivered with older techniques from the HYPO-RT-PC trial (1), early but robust data on modern SBRT from the PACE-B trial (2), and long-term follow-up data from a multi-institutional SBRT consortium (3). Further multi-institutional data (4) and several small randomized phase II trials (5, 6) have built a case for SBRT in high-risk prostate cancer and for use for metastasis-directed therapy in oligometastatic prostate cancer. Exciting clinical data also highlight the potential role for SBRT in the post-prostatectomy setting (7–10) and as a re-irradiation modality in radiorecurrent disease (11–13). Moreover, technological advances in real time image guided SBRT with MRI or PET have great potential. For example, the MIRAGE trial, the first randomized trial comparing MRI-guided with standard CT-guided SBRT seems to confirm a promising role for this innovative technique in prostate SBRT. (14) Yet, despite these advances, questions still remain. Can urinary and rectal toxicity be further mitigated? What patient factors—clinical, demographic, or otherwise—impact treatment efficacy? How can we better understand response to SBRT, both in the definitive setting and in the oligometastatic setting? And how does SBRT compare to other forms of re-irradiation?

This collection features 14 articles exploring the role of SBRT in prostate cancer across the entire spectrum of its natural history. Five manuscripts focus on practical considerations and interventions that might optimize the therapeutic ratio when delivering SBRT. Pham et al. explore the geometric distortions and variations in the urethra that might have dosimetric consequences for patients undergoing SBRT. Panizza et al. describe intrafraction motion during intact prostate SBRT as captured by electromagnetic tracking. Repka et al. review the rationale for using hydrogel spacers with prostate SBRT (Repka et al), while Kundu et al. provide a dosimetric and toxicity

analysis of patients who received SBRT and either had or did not have a spacer placed. Finally, Greco et al. describe seven year outcomes following dose-escalated SBRT wherein an endorectal balloon was used for mobilization/stabilization and a Foley catheter with implanted electromagnetic beacons was used to track and spare the urethra.

The next set of six articles explore efficacy and toxicity profiles among patients receiving SBRT for localized prostate cancer. Fuller et al. provide long-awaited 10-year outcomes from a multi-center phase II trial of high dose rate brachytherapy-like SBRT for intermediate risk prostate cancer. Three reports from the Georgetown SBRT group explore the incidence and natural history of post-SBRT hematospermia (Shah et al.), the implications of treatment interruptions (Pepin et al.), and the financial burden of SBRT (Sholklapper et al.). Correa and Loblaw provide a detailed review of the clinical evidence for SBRT in the context of high-risk disease. Finally, Liu et al. describe the ARGOS/CLIMBER protocol, in which men have pre-treatment and scheduled post-treatment multiparametric MRI and prostate specific membrane antigen positron emission tomography to establish imaging biomarkers of treatment response.

The collection is rounded out by three articles focusing on patients with recurrent disease. Cuccia et al. report on the outcomes of MRI-guided SBRT for re-irradiation of the prostate in men with radiorecurrent disease. Ryg et al. similarly explore long-term outcomes following salvage high dose-rate brachytherapy vs. salvage CT-guided SBRT. Finally, Mercier et al. report survival outcomes and failure patterns among men getting metastasis-directed SBRT for hormone sensitive or castrate resistant metastatic prostate cancer.

SBRT has demonstrated great success thus far for the definitive treatment of localized prostate cancer, but multiple important areas

of investigation exist. These include: optimizing treatment by minimizing toxicity, evaluating long-term results in low and intermediate risk disease, better understanding its role in high risk disease, developing better markers of radioresponsiveness, exploring SBRT in the post-prostatectomy setting and for re-irradiation of radiorecurrent disease, and optimizing SBRT for metastasis-directed therapy. We hope that this broad collection of articles summarizes these exciting areas of active research while underscoring the efficacy and safety of SBRT for prostate cancer.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Widmark A, Gunnlaugsson A, Beckman L, Thellenberg-Karlsson C, Hoyer M, Lagerlund M, et al. Ultra-hypofractionated versus conventionally fractionated radiotherapy for prostate cancer: 5-year outcomes of the HYPO-RT-PC randomised, non-inferiority, phase 3 trial. *Lancet* (2019) 394(10196):385–95. doi: 10.1016/s0140-6736(19)31131-6
- Brand DH, Tree AC, Ostler P, van der Voet H, Loblaw A, Chu W, et al. Intensity-modulated fractionated radiotherapy versus stereotactic body radiotherapy for prostate cancer (PACE-b): acute toxicity findings from an international, randomised, open-label, phase 3, non-inferiority trial. *Lancet Oncol* (2019) 20(11):1531–43. doi: 10.1016/s1470-2045(19)30569-8
- Kishan AU, Dang A, Katz AJ, Mantz CA, Collins SP, Aghdam N, et al. Long-term outcomes of stereotactic body radiotherapy for low-risk and intermediate-risk prostate cancer. *JAMA Netw Open* (2019) 2(2):e188006. doi: 10.1001/jamanetworkopen.2018.8006
- van Dams R, Jiang NY, Fuller DB, Loblaw A, Jiang T, Katz AJ, et al. Stereotactic body radiotherapy for high-risk localized carcinoma of the prostate (SHARP) consortium: Analysis of 344 prospectively treated patients. *Int J Radiat Oncol Biol Phys* (2021) 110(3):731–7. doi: 10.1016/j.ijrobp.2021.01.016
- Ost P, Reynders D, Decaestecker K, Fonteyne V, Lumen N, De Bruycker A, et al. Surveillance or metastasis-directed therapy for oligometastatic prostate cancer recurrence: A prospective, randomized, multicenter phase II trial. *J Clin Oncol* (2018) 36(5):446–53. doi: 10.1200/jco.2017.75.4853
- Phillips R, Shi WY, Deek M, Radwan N, Lim SJ, Antonarakis ES, et al. Outcomes of observation vs stereotactic ablative radiation for oligometastatic prostate cancer: The ORIOLE phase 2 randomized clinical trial. *JAMA Oncol* (2020) 6(5):650–9. doi: 10.1001/jamaoncol.2020.0147
- Ballas LK, Luo C, Chung E, Kishan AU, Shuryak I, Quinn DI, et al. Phase 1 trial of SBRT to the prostate fossa after prostatectomy. *Int J Radiat Oncol Biol Phys* (2019) 104(1):50–60. doi: 10.1016/j.ijrobp.2018.12.047
- Francolini G, Jerezek-Fossa BA, Di Cataldo V, Simontacchi G, Marvaso G, Zerella MA, et al. Stereotactic radiotherapy for prostate bed recurrence after prostatectomy, a multicentric series. *BJU Int* (2020) 125(3):417–25. doi: 10.1111/bju.14924
- Ma TM, Ballas LK, Wilhalme H, Sachdeva A, Chong N, Sharma S, et al. Quality-of-Life outcomes and toxicity profile among patients with localized prostate cancer after radical prostatectomy treated with stereotactic body radiation: The SCIMITAR multi-center phase 2 trial. *Int J Radiat Oncol Biol Phys* (2022). doi: 10.1016/j.ijrobp.2022.08.041
- Sampath S, Frankel P, Vecchio BD, Ruel N, Yuh B, Liu A, et al. Stereotactic body radiation therapy to the prostate bed: Results of a phase 1 dose-escalation

trial. *Int J Radiat Oncol Biol Phys* (2020) 106(3):537–45. doi: 10.1016/j.ijrobp.2019.11.005

11. Fuller D, Wurzer J, Shirazi R, Bridge S, Law J, Crabtree T, et al. Retreatment for local recurrence of prostatic carcinoma after prior therapeutic irradiation: Efficacy and toxicity of HDR-like SBRT. *Int J Radiat Oncol Biol Phys* (2020) 106(2):291–9. doi: 10.1016/j.ijrobp.2019.10.014

12. Jerezek-Fossa BA, Rojas DP, Zerini D, Fodor C, Viola A, Fanetti G, et al. Reirradiation for isolated local recurrence of prostate cancer: Mono-institutional series of 64 patients treated with salvage stereotactic body radiotherapy (SBRT). *Br J Radiol* (2019) 92(1094):20180494. doi: 10.1259/bjr.20180494

13. Pasquier D, Martinage G, Janoray G, Rojas DP, Zerini D, Goupy F, et al. Salvage stereotactic body radiation therapy for local prostate cancer recurrence after radiation therapy: A retrospective multicenter study of the GETUG. *Int J Radiat Oncol Biol Phys* (2019) 105(4):727–34. doi: 10.1016/j.ijrobp.2019.07.012

14. Kishan AU, Lamb J, Casado M, Wang X, Ma TM, Low D, et al. Magnetic resonance imaging-guided versus computed tomography-guided stereotactic body radiotherapy for prostate cancer (MIRAGE): Interim analysis of a phase III randomized trial. *J Clin Oncol* (2022) 40(6_suppl):255–5. doi: 10.1200/JCO.2022.40.6_suppl.255