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Dramatically Polarized Opinion on the Role of Brachytherapy Boost in Management of High-risk Prostate Cancer: A Survey of North American Genitourinary Expert Radiation Oncologists

Abstract

Introduction: Three randomized clinical trials have established brachytherapy (BT) boost in combination with external beam radiation therapy (EBRT) and androgen deprivation therapy (ADT) as superior to definitive EBRT and ADT alone in terms of biochemical control (but not overall survival) at the expense of increased toxicity in men with high-risk (HR) prostate cancer (PCa). The current view regarding these 2 treatment algorithms among North American genitourinary (GU) experts is not known. **Methods:** A survey was distributed to 88 practicing North American GU physicians serving on decision-making committees of cooperative group research organizations. Questions pertained to opinions regarding BT as monotherapy for low-risk PCa and BT boost for HR PCa. Responders were asked to self-identify as BT experts versus non-experts. Treatment recommendations were correlated with practice patterns using the Fisher exact test. **Results:** Forty-two radiation oncologists completed the survey, of whom 23 (55%) recommend EBRT and ADT alone and 19 (45%) recommend addition of BT boost. Twenty-five participants (60%) identified themselves as BT experts. Nearly 90% of those recommending BT boost were BT experts versus approximately 10% of non-BT experts ($P < .001$). Responders who recommended BT monotherapy as first-choice treatment for low-risk PCa were more likely to recommend BT boost for HR PCa ($P < .0001$). **Conclusions:** There is a dramatic polarization in opinions regarding incorporation of BT boost into EBRT + ADT therapy for patients with HR PCa among North American GU radiation oncology experts, who serve on decision-making committees and influence the national treatment guidelines and future clinical trials. Those who identify themselves as BT experts are significantly more likely to recommend BT boost. These findings are likely to influence the national guidelines and implementation of BT boost in current and future North American PCa clinical studies.

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Introduction

Three randomized clinical trials have established brachytherapy boost in combination with external beam radiation therapy (EBRT) and androgen deprivation therapy (ADT) as superior to definitive EBRT and ADT alone in terms of biochemical control, at the expense of increased toxicity in men with high-risk (HR)

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prostate cancer (PCa), a population comprising 63% of the 720 patients studied in these trials.[1-6] However, in the absence of more tangible endpoints, such as overall survival or development of metastatic disease, many physicians are reluctant to recommend brachytherapy boost for these patients owing to increased toxicity. Moreover, prostate brachytherapy utilization in the United States has continued to decrease in both private and academic centers.[7] In addition to lack of experience and expertise, financial and other logistical reasons may be an impediment to brachytherapy boost integration into the standard clinical practice in the United States.

National guidelines and future clinical trials in North America (NA) are determined by a group of expert GU radiation oncologists, who sit on decision-making committees of cooperative group studies and task force groups. We sought to determine the current view of brachytherapy boost in HR PCa among NA GU radiation oncologist experts.

Methods

Survey Design and Deployment

The survey was designed to identify characteristics of each respondent's typical practice patterns, as well as to assess their personal opinions on the role of brachytherapy as monotherapy for low-risk (LR) PCa and brachytherapy boost for HR PCa. Survey questions specified Gleason 6 disease when defining LR PCa; to simplify the survey, the Gleason score was used to drive the risk category, particularly in the current era of PSA detection where the majority of patients do not have a clinically palpable nodule on examination. Eighty-eight currently practicing NA GU oncology physicians were contacted by email and invited to complete the survey; all physicians were selected based on their membership in NRG Oncology, which is inclusive of both the United States and Canada. Specific national subgroups (ie, the National Cancer Institute of Canada Clinical Trials Genitourinary Group) were not specifically targeted for inclusion. The survey was designed and hosted by Research Electronic Data Capture (REDCap), and contained screening questions to ensure respondents were currently practicing, not in training, and specializing in GU oncology.[8] Responders were asked to self-identify as brachytherapy experts versus nonexperts. The distinction between LDR and HDR brachytherapy was not made in the survey questions, because the technique has not been shown to affect the outcomes, and both are considered equivalent by the authors of the 2017 American Society of Clinical Oncology/Cancer Care Ontario joint guideline update.[9]

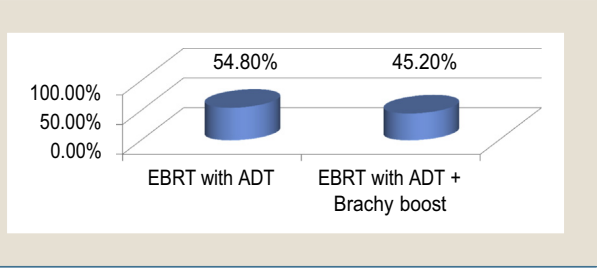
Statistical Analysis

Based on responses, participants were categorized as "supporters" or "opponents" of brachytherapy monotherapy for LR PCa and brachytherapy boost for HR PCa. Treatment recommendations were correlated with practice patterns using the Fisher exact test.

Results

Forty-two radiation oncologists completed the survey (a 47.8% response rate), of whom 23 (55%) recommended EBRT and ADT alone and 19 (45%) recommended the addition of brachytherapy boost for HR PCa (Figure 1; Table 1). Twenty-five participants (60%) identified themselves as brachytherapy experts. Nearly 90% of those recommending brachytherapy boost were self-identified brachytherapy experts versus approximately 10% of non-brachytherapy experts; 83% of experts who did not recommend brachytherapy boost were not self-identified brachytherapy experts ($P < .001$). For LR PCa, there was an even split regarding first-line therapy between brachytherapy versus EBRT/no preference (21 participants each). Responders who recommended brachytherapy monotherapy as first-choice treatment for LR PCa were more likely to recommend brachytherapy boost for HR PCa ($P < .0001$). No other demographic factors (years in practice, monthly patient volume, practice type, fractionation preference, or belief in advanced imaging techniques) were significant or approached significance for recommendation of brachytherapy boost in HR PCa.

Figure 1 First-choice Treatment for a Hypothetical Patient Diagnosed With High-risk Prostate Cancer, With No Baseline Urinary Symptoms and a 40 cc Prostate Gland. Results From Survey of North American Genitourinary Oncology Expert Radiation Oncologists



Abbreviations: ADT = androgen deprivation therapy; Brachy = brachytherapy; EBRT = external beam radiation therapy.

Discussion

The role of brachytherapy boost in HR PCa has been relatively underutilized despite Level I evidence supporting its superiority in biochemical control over EBRT + ADT alone, which has been present for more than a decade.[5] The disadvantages of

Table 1 Survey Questions Administered Regarding the Role of Brachytherapy Boost

Survey Question	Answer Choices	Responses
Do you consider yourself an expert brachytherapist?	Yes	25
	No	17
For patients with Gleason 6 disease who desire treatment, with no baseline urinary symptoms and a 40 cc prostate, which would you consider your first choice treatment?	EBRT/no preference between EBRT versus brachytherapy	21
	Brachytherapy	21
For patients with localized high-risk disease, with no baseline urinary symptoms and a 40 cc prostate, which would you consider your first choice for treatment?	EBRT with ADT	23
	EBRT with ADT and brachytherapy boost	19

Abbreviations: ADT = androgen deprivation therapy; EBRT = external beam radiation.

brachytherapy boost stem from 2 major factors: the first is reported increased treatment-related toxicity.[9,10] The second is the steadily decreasing popularity of brachytherapy over the past 10 to 15 years, which may result in a decreasing number of radiation oncologists having received sufficient brachytherapy training and case volume during residency training, particularly because the lowest brachytherapy utilization has been in academic centers.[7] Because cooperative group research organization committees play an integral role in the design of clinical studies and consequently the degree of acceptance or rejection of treatment modalities, we sought to determine the acceptance of brachytherapy boost for HR PCa among NA GU radiation oncology experts.[11]

Our findings indicate that despite the compelling evidence regarding brachytherapy boost, there exists a dramatic polarization in opinions regarding the incorporation of brachytherapy boost for HR PCa among those most likely to influence future clinical trials and national treatment guidelines. Those who viewed brachytherapy as first-line treatment for LR PCa were more likely to view brachytherapy boost as preferable for HR PCa, an opinion that was not shared by their colleagues who did not view brachytherapy as first-line treatment for LR PCa. The common distinguishing factor separating these 2 groups of opinions was self-identified brachytherapy expertise, which indicates that the degree of personal brachytherapy expertise (rather than existing evidence) is the defining factor determining whether brachytherapy boost will be recommended for HR PCa treatment; no other demographic factor even approached significance with regard to treatment recommendations for HR PCa.

Limitations of this study include its small sample size—the number of GU oncology expert radiation oncologists who serve on cooperative group research organizations is miniscule compared with the general radiation oncology population. Second, because responses were in the format of multiple choice, the full range of opinions may not have been adequately captured. Additionally, survey fatigue can result in responses that are not genuine; we sought to curb this by not offering an incentive (financial or otherwise) to complete the survey that we hope maximized the rate of legitimate responses. To ameliorate survey fatigue, we have minimized the clinical information in hypothetical cases (such as providing Gleason 6 as a marker of LR PCa) and avoided discourse about various BT techniques (such as low- or high-dose rate BT). Therefore, this analysis could be viewed as an assessment of current clinical gestalt in management of patients with HR PCa. Finally, an important consideration is the underrepresentation of minorities in these patient populations with regard to clinical trials, a factor unable to be further assessed by our survey owing to a lack of granularity in the survey questions regarding the racial demographics of patients being treated; this is an important area for future studies to address.

In conclusion, there is a dramatic polarization in opinions regarding incorporation of brachytherapy boost into EBRT + ADT therapy for patients with HR PCa among NA GU radiation oncology experts, who serve on decision-making committees and influence the national treatment guidelines and future clinical trials. Those who identify themselves as brachytherapy experts are significantly more likely to recommend brachytherapy boost. These findings are likely to influence the national guidelines and implementation of brachytherapy boost in current and future NA PCa clinical studies.

Disclosure

The authors have stated that they have no conflicts of interest.

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