International Journal of
Radiation Oncology
biology • physics

www.redjournal.org

EDITORIAL

The Case for Prostate Brachytherapy in the Affordable Care Act Era

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Received Aug 21, 2014, and in revised form Sep 25, 2014. Accepted for publication Oct 7, 2014.

Few oncologic entities are more deserving of national scrutiny than low-risk prostate cancer. Prostate cancer is among the top 5 most costly cancers, with $11.9 billion spent annually in the United States (1). Recent publications have drawn attention to financially driven practices and questionable referral patterns (2, 3). The Congressional Budget Office estimates that half the increase in health care expenditures over the past decades has been driven by expanded capabilities associated with new technologies (4). Intensity modulated radiation therapy (IMRT) and proton therapy come to mind. IMRT now accounts for more than 80% of radiation therapy treatments (5). Brachytherapy, by contrast, has been steadily declining in the United States (6). Payors are taking notice. Blue Shield of California and Aetna have stopped covering proton therapy for prostate cancer. Government and privately administered health insurers cut costs by reimbursing IMRT at a fraction of the billable rate. Treating institutions respond by inflating rates to compensate for aggressive cuts.

Win-Win-Win

In this small corner of cancer care, brachytherapy presents a rare opportunity for a win-win-win for patient, provider, and payor. An estimated 20 million Americans have gained coverage under the Affordable Care Act (ACA) (7). The Congressional Budget Office projects that enrollment through the exchanges will be 13 million in 2015 and 25 million through 2024. An additional 5 million people will enroll in ACA-compliant plans outside of the exchanges through 2024 (8). The potential impact of millions of newly insured men is substantial. These patients will be younger than the Medicare population. The American Cancer Society estimates 233,000 new cases of prostate cancer in 2014. Forty percent are diagnosed in men under the age of 65 (9). Surveillance, Epidemiology, and End Results (SEER) data show an annual incidence of 57.9 prostate cancers per 100,000 under the age of 65 (10). Although these younger patients will have fewer cancers overall, a disproportionate number of them will have early cancers, and they will be candidates for local therapy such as brachytherapy.

Patient

No prospective randomized trials have evaluated the efficacy of external beam radiation therapy, brachytherapy, or radical prostatectomy. Retrospective data show no difference in biochemical failure among low-risk patients (11), though a meta-analysis of 848 published abstracts by the Prostate Cancer Results Study Group found that brachytherapy-based approaches trended toward superior biochemical-free progression (12). The patient is doubly benefited when one considers the productivity that is not lost during a protracted course of IMRT or postoperative recovery. Brachytherapy patients have comparable urinary symptoms, fewer bowel toxicities, and better sexual function than their external beam counterparts (13). In a prospective, nonrandomized quality of life study, erectile

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Conflict of interest: none.

Supplementary material for this article can be found at www.redjournal.org.

Int J Radiation Oncol Biol Phys, Vol. 91, No. 3, pp. 465–467, 2015
0360-3016/$ - see front matter Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.ijrobp.2014.10.014

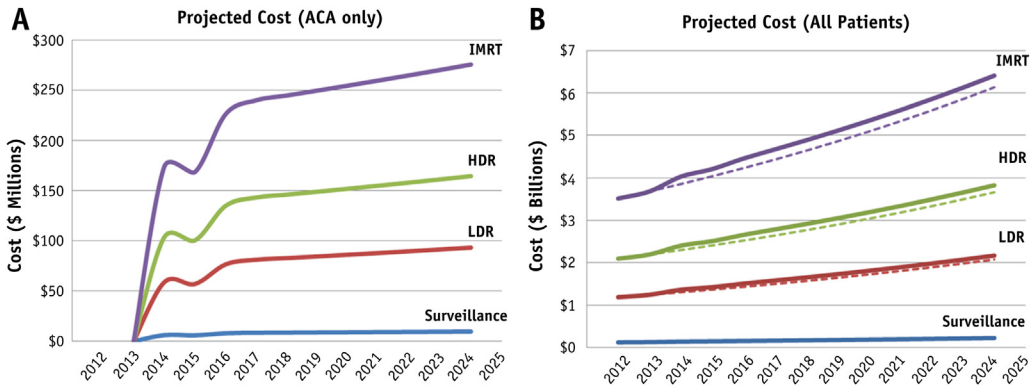

Fig. 1. Cost of treating low-risk prostate cancer by modality. Projections assume zero lag time to diagnosis and treatment. (A) Marginal cost of treatment resulting from implementation of the Affordable Care Act (ACA). The biphasic upsurge is due to the initial enrollment of 20 million people followed by an anticipated state-based adoption of the Medicaid expansion. (B) Total cost for the entire insured population of the United States. The dashed lines indicate baseline cost without the implementation of the ACA.

dysfunction was lower with brachytherapy than prostatectomy, although urinary symptoms were higher (14).

Payor

Over the next 10 years, population changes alone will drive a 27% increase in oncology spending (1). As an exercise, we estimated the cost of treating all low-risk cases by a single modality. Details on the methods used for these estimates can be found in the supplementary material available online at www.redjournal.org. We project an additional 70,110 cases of early prostate cancers over the next 10 years as a result of implementing the ACA. Treating all cases of low-risk disease with brachytherapy over the next 10 years would amount to $18.3 billion for low-dose-rate (LDR) therapy and $32.2 billion for high-dose-rate (HDR) therapy in four fractions. The cost soars to $54.0 billion when one considers the prospect of treating all cases by IMRT. The cost of active surveillance would be $1.9 billion. The marginal cost of men treated under the ACA is relatively small: $797 million for LDR, $1.4 billion for HDR, and $2.4 billion for IMRT (Fig. 1).

Treating Institution

Profit is maximized by billing more and reducing costs. The latter is a key issue for radiation oncologists. The recently released Medicare payment data reveal high overhead cost for radiation therapy facilities, largely resulting from space requirements, expensive equipment, shielding regulations, source replacement, staffing, service contracts, and technical services. When these variables are accounted for, the institutional costs for HDR ($5467) and LDR ($2395) are substantially lower than for IMRT ($23,665) (15). A detailed cost analysis showed economic efficiencies for both payor and provider when brachytherapy was chosen over IMRT (15). Put simply, brachytherapy may be more profitable than IMRT.

Conclusion

This exercise in low-risk prostate cancer demonstrates the opportunity to benefit patients, payors, and institutions with the use of brachytherapy. Readers are cautioned that our conclusions are based on many assumptions derived from data of varying quality. Sensitivity analysis is not provided. Estimates for profitability do not account for variability in institutional overhead, economies of scale, and multiple other operational and accounting specifics. Cost projections are for initial treatment only. We do not account for subsequent treatment or management of complications. This cost comparison may differ based on future reimbursement rates. This work is not a cost-effectiveness analysis and should not be interpreted as such. Active surveillance as an initial strategy for low-risk prostate cancer is not included in this comparison, yet is associated with the least initial cost. The lifetime cost for active surveillance is likely higher than brachytherapy because the base-case average lifetime cost of active surveillance is considerably higher, which is especially important when one considers the longer follow-up time and greater conversion to active treatment in younger patients who are good candidates for brachytherapy (16, 17).

Radiation oncologists should be proactive to the reintroduction and expansion of brachytherapy for prostate cancer. Patient-centered outcomes will be a driving force in the era of the ACA. With national scrutiny and negative attention from the Government Accountability Office on the line (2), it is never too early to reexamine and improve the education and practice of brachytherapy in our field.

References

1. Mariotto AB, Yabroff KR, Shao Y, et al. Projections of the cost of cancer care in the United States: 2010-2020. *J Natl Cancer Inst* 2011; 103:117-128.

2. Mitchell JM. Urologists' use of intensity-modulated radiation therapy for prostate cancer. *N Engl J Med* 2013;369:1629-1637.
3. Elliott SP, Jarosek SL, Wilt TJ, et al. Reduction in physician reimbursement and use of hormone therapy in prostate cancer. *J Natl Cancer Inst* 2010;102:1826-1834.
4. Congressional Budget Office. Technological change and the growth of health care spending. Congressional Budget Office; 200812. Available at: www.cbo.gov/sites/default/files/cbofiles/ftpdocs/89xx/doc8947/01-31-techhealth.pdf. Accessed December 24, 2013.
5. Nguyen PL, Gu X, Lipsitz SR, et al. Cost implications of the rapid adoption of newer technologies for treating prostate cancer. *J Clin Oncol* 2011;29:1517-1524.
6. Elliott SP, Jarosek SL, Virnig BA. Changes across time and geography in the use of prostate radiation technologies for newly diagnosed older cancer patients. Types of prostate radiation. Data Points # 16 (prepared by the University of Minnesota DEcIDE Center, under Contract No. HHSA29020100013I). Rockville, MD: Agency for Healthcare Research and Quality; November 2012. AHRQ Publication No. 12-EHC095-EF.
7. Blumenthal D, Collins SR. Health care coverage under the Affordable Care Act: A progress report. *N Engl J Med* 2014;371:275-281.
8. Congressional Budget Office. Updated estimates of the effects of the insurance coverage provisions of the Affordable Care Act, April 2014: http://www.cbo.gov/publication/45231. Accessed December 24, 2013.
9. American Cancer Society. Cancer Facts & Figures, 2014. American Cancer Society. Atlanta, GA.
10. *SEER Cancer Statistics Factsheets: Prostate Cancer.* Bethesda, MD: National Cancer Institute; 2014, http://seer.cancer.gov/statfacts/html/prost.html. Accessed September 8, 2014.
11. D'Amico AV, Whittington R, Malkowicz SB, et al. Biochemical outcome after radical prostatectomy, external beam radiation therapy, or interstitial radiation therapy for clinically localized prostate cancer. *JAMA* 1998;280:969-974.
12. Grimm P, Billiet I, Bostwick D, et al. Comparative analysis of prostate-specific antigen free survival outcomes for patients with low, intermediate and high risk prostate cancer treatment by radical therapy. Results from the Prostate Cancer Results Study Group. *BJU Int* 2012;109(Suppl 1):22-29.
13. Chen RC, Clark JA, Talcott JA. Individualizing quality-of-life outcomes reporting: How localized prostate cancer treatments affect patients with different levels of baseline urinary, bowel, and sexual function. *J Clin Oncol* 2009;27:3916-3922.
14. Sanda MG, Dunn RL, Michalski J, et al. Quality of life and satisfaction with outcome among prostate-cancer survivors. *N Engl J Med* 2008;358:1250-1261.
15. Shah C, Lanni TB Jr, Ghilezan MI, et al. Brachytherapy provides comparable outcomes and improved cost-effectiveness in the treatment of low/intermediate prostate cancer. *Brachytherapy* 2012;11:441-445.
16. Hayes JH, Ollendorf DA, Pearson SD, et al. Observation versus initial treatment for men with localized, low-risk prostate cancer: A cost-effectiveness analysis. *Ann Intern Med* 2013;158:853-860.
17. Ollendorf DA, Hayes J, McMahon P, et al. Management options for low-risk prostate cancer: A report on comparative effectiveness and value. Boston, MA: Institute for Clinical and Economic Review, December 2009: Available at: http://www.icer-review.org/index.php/mgmtoptionlrpc.html. Accessed December 27, 2013.