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Platinum Priority – Prostate Cancer

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Urologist Practice Affiliation and Intensity-modulated Radiation Therapy for Prostate Cancer in the Elderly

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Abstract

Background: Prostate cancer treatment is a significant source of morbidity and spending. Some men with prostate cancer, particularly those with significant health problems, are unlikely to benefit from treatment.

Objective: To assess relationships between financial incentives associated with urologist ownership of radiation facilities and treatment for prostate cancer.

Design, setting, and participants: A retrospective cohort of Medicare beneficiaries with prostate cancer diagnosed between 2010 and 2012. Patients were further classified by their risk of dying from noncancer causes in the 10 yr following their cancer diagnosis by using a mortality model derived from comparable patients known to be cancer-free.

Intervention: Urologists were categorized by their practice affiliation (single-specialty groups by size, multispecialty group) and ownership of a radiation facility.

Outcome measurements and analysis: Use of intensity-modulated radiation therapy (IMRT) and use of any treatment within 1 yr of diagnosis. Generalized estimating equations were used to adjust for patient differences.

Results: Among men with newly diagnosed prostate cancer, use of IMRT ranged from 24% in multispecialty groups to 37% in large urology groups ($p < 0.001$). Patients managed in groups with IMRT ownership ($n = 5133$) were more likely to receive IMRT than those managed by single-specialty groups without ownership (43% vs 30%, $p < 0.001$), regardless of group size. Among patients with a very high risk ($> 75\%$) of noncancer mortality within 10 yr of diagnosis, both IMRT use (42% vs 26%, $p < 0.001$) and overall treatment (53% vs 44%, $p < 0.001$) were more likely in groups with ownership than in those without, respectively.

Conclusions: Urologists practicing in single-specialty groups with an ownership interest in radiation therapy are more likely to treat men with prostate cancer, including those with a high risk of noncancer mortality.

Patient summary: We assessed treatment for prostate cancer among urologists with varying levels of financial incentives favoring intervention. Those with stronger incentives, as determined by ownership interest in a radiation facility, were more likely to treat prostate cancer, even when treatment was unlikely to provide a survival benefit to the patient.

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1. Introduction

Although many prostate cancers are slow-growing and do not affect survival even with conservative management, particularly in patients with multiple health problems and the elderly [1], the majority of diagnosed men in the USA are treated. Commensurate with broader trends in health care, spending for prostate cancer has increased more than 10% annually over the past decade and now approaches \$12 billion in the USA alone [2,3]. Reasons for the spending growth are likely multifactorial, but almost certainly include the high rates of treatment and dissemination of new options for therapy [4], such as robotic surgery, intensity-modulated radiation therapy (IMRT), and proton beam radiation therapy, all of which are incrementally more expensive than the prior alternatives.

Recent trends in the organization of urological practice towards the formation of large single-specialty groups in the USA may also contribute to the increase in prostate cancer spending. Volume-based productivity bonus arrangements frequently implemented in larger practices may encourage the use of prostate cancer services. Further, some urology groups have purchased the equipment necessary to deliver IMRT and employed radiation oncologists to provide the treatment. These urology groups thus have the potential to collect both the professional and technical revenue from IMRT that otherwise would have been lost to other physicians, though not all groups are organized to take full advantage of these potential revenue streams.

For these reasons, we performed a national study to determine the association of urologist practice size and ownership of IMRT with patterns of treatment for prostate cancer. In particular, we were interested in assessing the effects of ownership on treatment among men with a high probability of noncancer-related death, or arguably those who stand the least to benefit from intervention.

2. Materials and methods

2.1. Data and study population

We performed a retrospective cohort study of fee-for-service Medicare beneficiaries with newly diagnosed prostate cancer between 2010 and 2012 using a 20% national sample. Incident cases of prostate cancer were identified using an algorithm validated with a cancer registry data (specificity and positive predictive value of 99.8% and 88.7%, respectively) [5]. Only patients eligible for both Parts A and B throughout this period were included in the study. Beneficiaries participating in Medicare managed care plans were excluded. Follow-up for all beneficiaries was available through December 31, 2013. Each patient was attributed to a urologist using well-established methods [6].

2.2. Characterizing urologist practice organization

We used explicit fields in the Healthcare Relational Spheres provider files (IMS Health) to characterize urologist practice organization (single-specialty vs multispecialty group). For urologists in single-specialty groups, we ascertained additional information from public records, including whether IMRT was provided onsite. Urologists were considered owners of IMRT when their practice website advertised providing IMRT onsite or when their group employed at least one radiation

oncologist. Organizations technically owning an IMRT vault, but with weak incentives to profit from its use at the physician level (eg, some academic medical centers), were classified as nonowners. For practical reasons, ownership was ascertained once for each group in 2012, which was prior to the release of Medicare claims for 2012 and 2013. It was held constant for the entire study period. If a group containing urologists included one or more primary care physicians as well, the group was categorized as multispecialty. Using this approach, we identified 1546 urologists practicing in a multispecialty group and 4835 practicing in a single-specialty group. Single-specialty practices were further stratified according to the number of urologists in each group: one to two urologists (very small), three to five urologists (small), six to nine urologists (medium), and 10 or more urologists (large).

2.3. Outcomes

Our primary outcome was the use of IMRT within 12 mo of diagnosis and was measured at the beneficiary level. Additionally, we characterized other initial management strategies (none, other forms of external beam radiation, brachytherapy, cryotherapy, and surgery) using established methods [4]. Because our focus was on patterns of treatment with curative intent, patients managed with androgen deprivation only, watchful waiting, or surveillance were combined to form the “none” category. Patients treated with androgen deprivation and a curative treatment (eg, radiation) were categorized as having had that curative treatment. Patients having both surgery and radiation were classified as having had surgery.

Due to the protracted natural history of prostate cancer, including even for high-grade cancers in some cases, intervention is generally not recommended for those with a very high risk of death from other causes within 10 yr of their prostate cancer diagnosis [4,7]. We therefore developed a logistic regression model predicting noncancer mortality using a 5% sample of Medicare beneficiaries between 2004 and 2013 identified as cancer-free by the Surveillance, Epidemiology, and End Results Program (SEER). The model incorporated age, race, comorbidity [8], socioeconomic class measured at the 5-digit zip code level [9], census region, and time at risk (C-index 0.82) [4,10,11]. We applied the estimated coefficients from this model to our cohort of newly diagnosed prostate cancer patients, computing each patient’s predicted risk of death within 10 yr of diagnosis (the time at risk) absent their prostate cancer diagnosis. This predicted risk was then categorized as follows: risk of noncancer mortality less than or equal to 25% (“low”), greater than 25% to less than or equal to 50% (“intermediate”), greater than 50% to less or equal to 75% (“high”), and greater than 75% (“very high”).

2.4. Analysis

We first compared patient and regional characteristics across urologist practice types using chi-square statistics. To examine the independent effect of urologist practice type, or IMRT ownership, on rates of treatment for prostate cancer, we fit multivariable logistic regression models using patient-level treatment as the outcome. To account for the clustered nature of the data (patient within a Hospital Referral Region, defined by the Dartmouth Atlas of Health Care) [12], we utilized generalized estimating equations. All models were adjusted for patient age, race, comorbidity [8], socioeconomic class [9], urban versus nonurban residence and regional variables, including supply of urologists, radiation oncologists, hospital beds, and Medicare managed care penetration. For analyses focusing on treatment rates by risk of noncancer mortality, models were stratified by urologist ownership of IMRT. In all cases, we derived the adjusted percentages of patients treated across urologist practice type or IMRT ownership status by back-transforming the predicted use from the models. This was achieved by taking the predicted population marginal means at each level of the variable of interest derived from the multivariable logistic regression model. The

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