

Research Letter

Initiative to reduce bone scans for low-risk prostate cancer patients: A quasi-experimental before-and-after study in a Veterans Affairs hospital

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Abstract

Purpose: Bone scans (BS) are a low-value test for asymptomatic men with low-risk prostate cancer. We performed a quality improvement intervention aimed at reducing BS for these patients.

Methods and materials: The intervention was a presentation that leveraged the behavioral science concepts of social comparison and normative appeals. Participants were multidisciplinary stakeholders from the Radiation Oncology and Urology services at a Veterans Affairs hospital. We determined the baseline rate of BS by retrospectively analyzing cases of asymptomatic men with newly diagnosed low-risk prostate cancer. For social comparison, we presented contemporary peer BS rates in the United States—including Veterans Affairs hospitals. For normative appeals, we reviewed guidelines from various professional groups. To analyze the effect of this intervention, we performed a quasi-experimental, uncontrolled, before-and-after study.

Results: During the 1-year period before the intervention, 32 of 37 patients with low-risk prostate cancer (86.5%) received a BS. The contemporary peer rate was approximately 30%. All reviewed guidelines recommended against BS. During the 1-year period after the intervention, the rate of BS was reduced to 65.5% (19 of 29 patients; $P = .043$ by one-sided Fisher's exact test).

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Conclusions: We observed a modest reduction in guideline-discordant BS after the quality improvement intervention. BS rates might be influenced by initiatives that combine social comparisons with appeals to professional norms.

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Introduction

Asymptomatic men with low-risk prostate cancer rarely harbor osseous metastases. Therefore, bone scans (BS) are a low-value test in this population. The scans inconvenience patients, use health care resources, and can yield false positive results that beget further intervention.¹ For these reasons, major evidence-based guidelines recommend against their use.²⁻⁵

However, guideline-discordant BS remain an issue nationwide.^{1,6-8} Similarly, we noticed that many patients with low-risk prostate cancer at our hospital were receiving this test. Therefore, we performed a quality improvement intervention with the specific aim of reducing BS for these patients. We based the intervention on 2 strategies from behavioral science: social comparisons and normative appeals.⁹⁻¹² Social comparisons influence health care providers by explicitly showing performance vis-à-vis peers.^{9,10} Normative appeals leverage professional value judgments about appropriate care.¹⁰⁻¹² These principles may work best when combined,¹² so we paired them in our intervention.

Methods and materials

We conducted this study with ethics approval of the local Department of Veterans Affairs (VA) Research and Development committee (Protocol #01584), and we report this work using the Standards for Quality Improvement Reporting Excellence, Version 2.0 guidelines.¹³

The context for the study was the Michael J. Crescenz VA Medical Center, an urban Philadelphia hospital affiliated with the University of Pennsylvania. Veterans with newly diagnosed prostate cancer are evaluated in consultation with both the Urology and Radiation Oncology services. These outpatient clinics are run by resident physicians and physician assistants who are both under the supervision of attending staff physicians (2 radiation oncologists and 2 urologists). A unique feature of this integrated health care system is that it lacks fee-for-service incentives that may drive test overutilization in other settings.¹⁴

The quality improvement intervention was a presentation that combined self-assessment, social comparison, and normative appeals. The presentation was delivered by the first author at a multidisciplinary meeting in July 2014; participants included the chief of Radiation Oncology, chief of Urology, chair of the Cancer Committee, and resident physicians/physician assistants from both services. We

revealed our own rates of guideline-discordant BS, presented peer comparison data, and reviewed the professional guidelines.

For the self-assessment, we retrospectively analyzed our rate of guideline-discordant BS over a 1-year period prior to the intervention (June 2013 to June 2014). Eligible patients had newly diagnosed, intact, untreated prostate cancer that was low-risk by D'Amico criteria (clinical T-category \leq T2a, Gleason sum \leq 6, and prostate-specific antigen level $<$ 10 ng/mL). Further criteria included no documented complaint of bony pain, evaluation by both the Radiation Oncology and Urology services, and prostate cancer workup that was conducted within the Crescenz VA hospital. For social comparison, we conducted a literature search to determine the contemporary peer rates of guideline-discordant BS in the United States,^{1,6-8,15} including figures for VA hospitals.^{14,16,17} For professional norms, we reviewed guidelines from the American Urologic Association, National Comprehensive Cancer Network, American Society of Clinical Oncology, and American College of Radiology.²⁻⁵

To analyze the effect of this intervention, we performed a quasi-experimental, uncontrolled, before-and-after study.¹⁸ Because some patients were already in the process of workup for their prostate cancer, we a priori allowed a 3-month washout period after the intervention. We then examined the rates of guideline-discordant BS for a 1-year postintervention period (November 2014 to November 2015). We compared the preintervention and postintervention rates using Fisher's exact test because of small sample sizes. For this hypothesis-generating study, we chose a one-sided test because we did not expect the intervention to increase the rate of guideline-discordant BS; we were only interested in testing whether it decreased the rate. We used STATA Version 14.0 (StataCorp, College Station, TX) and considered $P < .05$ to be statistically significant.

Results

Fig 1 shows a conceptual schematic of the quality improvement project. Before the intervention, 32 of 37 patients with low-risk prostate cancer (86.5%) received a BS. The contemporary peer rate was approximately 30%. All reviewed guidelines recommended against BS for asymptomatic men with low-risk disease. After the intervention, the rate of BS was reduced to 65.5% (19 of 29 patients, $P = .043$; Fig 2).

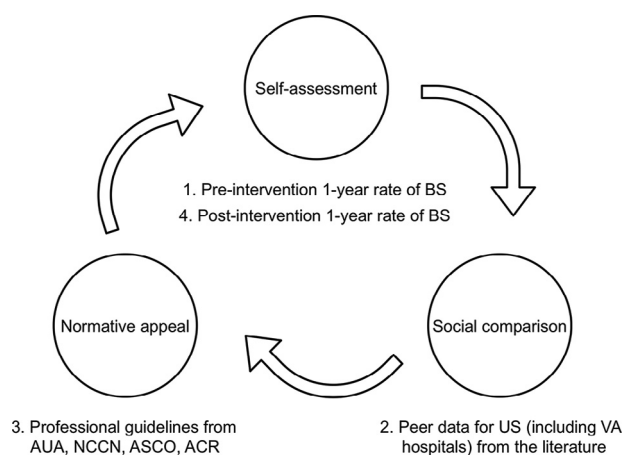


Figure 1 Conceptual schematic of the intervention. ACR, American College of Radiology; ASCO, American Society of Clinical Oncology; AUA, American Urological Association; BS, bone scan; NCCN, National Comprehensive Cancer Network; VA, Veterans Affairs.

Discussion

We observed fewer guideline-discordant BS after the quality improvement intervention. This reduction was statistically significant but modest in magnitude. Despite the intervention, our BS rate remained higher than comparable peer data, suggesting additional factors are at play that warrant further investigation.

These findings may be of particularly timely interest to clinicians. The Medicare Access and CHIP Reauthorization Act final rule was released in October 2016, and the rate of BS for patients with low-risk prostate cancer will now be a specialty-specific quality measure for radiation oncologists and urologists.^{19(pp7762,77767)} Therefore, practices may be seeking interventions to reduce guideline-discordant BS.

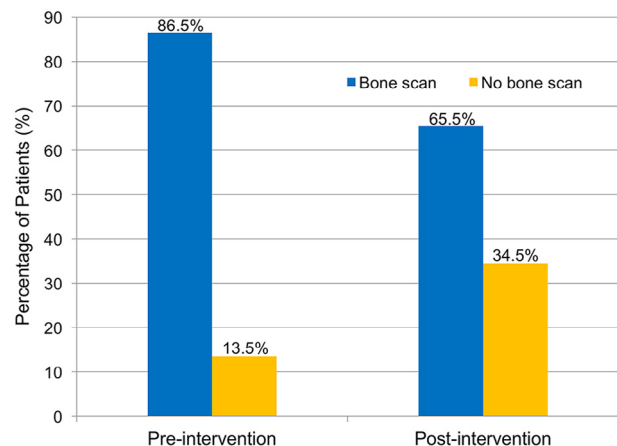


Figure 2 Rates of bone scans for patients with low-risk prostate cancer before and after the intervention.

Possible interventions fall along a spectrum of intrusiveness.^{20(pp41,42)} The initiative presented here is minimally intrusive and provides information while gently nudging decision makers using social comparisons and normative appeals.¹² Although attractive, these minimally intrusive interventions may yield only modest behavioral changes.²¹ More intrusive strategies such as financial incentives¹⁹ or default options²² might have a greater effect.²⁰ Alternatively, our modest BS reduction could reflect the limitations of a one-time intervention.²³ As a next step, we plan to repeat this initiative at regular intervals.

This study has several limitations that should be emphasized. It is unclear whether the results are generalizable to larger practices or systems with a fee-for-service structure. Furthermore, the results must be cautiously interpreted due to the study design—particularly given the lack of a control group.¹⁸ The reduction in BS rates might alternatively be explained by broader temporal changes in practice, regression to the mean, the Hawthorne effect, or other factors. Although the current study shows an association, it does not establish causation.

What this study does do, however, is generate a hypothesis: The rates of guideline-discordant BS might be modestly reduced by a straightforward, minimally burdensome intervention that combines social comparisons with appeals to professional norms. This hypothesis can now be tested by other studies that are more rigorously designed.

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