Prostate Needle Biopsy Outcomes in the Era of the U.S. Preventive Services Task Force Recommendation against Prostate Specific Antigen Based Screening

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Abbreviations and Acronyms

AUA = American Urological Association

AUASS = AUA symptom score

CAPRA = Cancer of the Prostate Risk Assessment

PCa = prostate cancer

PCP = primary care physician

PNB = prostate needle biopsies

PSA = prostate specific antigen

USPSTF = U.S. Preventive Services Task Force

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Purpose: We determined whether the characteristics of patients undergoing prostate needle biopsies and prostate needle biopsy results changed after the U.S. Preventive Services Task Force recommendation in 2012 against prostate specific antigen based screening for prostate cancer for men of any age.

Materials and Methods: A prospective database of patients undergoing prostate needle biopsies at Virginia Mason from 2004 to 2014 was reviewed. Welch's t-test and chi-square tests were used to compare patients seen before to those seen after the USPSTF recommendation. Relative risks and corresponding confidence intervals were estimated by general linear regression.

Results: Patients in the post-USPSTF group (310) had a higher prostate specific antigen ($p < 0.001$), were more likely to be diagnosed with higher clinical stage (2b, $p=0.003$; 2c-3a, $p=0.027$) and D'Amico high risk prostate cancer ($p=0.036$), with an adjusted relative risk for high risk prostate cancer of 1.25 (95% CI 1.02−1.52) compared to those in the pre-USPSTF group (1,416). Limiting the pre-USPSTF group to the 30 months before the draft guidelines (448 patients) yielded similar results. The absolute number of biopsies performed decreased by 31%, with the majority of the decrease occurring in the detection of intermediate risk tumors.

Conclusions: In the 2 and a half years after the USPSTF recommendation against prostate specific antigen based screening, patients undergoing prostate needle biopsies were significantly more likely to be diagnosed with high risk disease. However, a reduction in the number of prostate needle biopsies performed occurred concomitantly with a decrease in the detection of intermediate risk, potentially curable prostate cancer. Future focus on informed application of screening techniques may prevent the reversal of decades of improvement in the prostate cancer mortality rate.

Key Words: prostatic neoplasms; prostate-specific antigen; early detection of cancer; government agencies; biopsy, needle

The U.S. Preventive Services Task Force issued a draft recommendation on October 7, 2011 against PSA based screening for prostate cancer for men of any age. On May 21, 2012 PSA based PCa screening received a final level D assessment from the USPSTF, suggesting that such screening causes harm to patients and should not be performed.[1] Their recommendation

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against PSA based screening was highly controversial, with many suggesting that evidence regarding the benefits and harms of testing had been misinterpreted.[2–5]

Central to the USPSTF recommendation were 2 landmark studies with conflicting results. The first was the U.S. Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial,[6,7] which concluded PSA screening did not result in fewer deaths due to PCa. In that study 76,685 men were randomly assigned to annual screening or "usual care," which sometimes included opportunistic screening. After 13 years of followup the incidence of death per 10,000 person-years was 3.7 (50 deaths) in the screening group and 3.4 (44 deaths) in the control group (RR 1.09, 95% CI 0.87−1.36). The authors concluded that there was no benefit to organized screening over opportunistic screening. However, almost half of the men in the nonscreened arm had undergone prior PSA based screening, resulting in "contamination"[8] and limiting the generalizability of the study results. In contrast, the second study, the European Randomized Study of Screening for Prostate Cancer, included 182,000 men between the ages of 55 and 74 years from 7 European countries, and revealed a 20% reduction in mortality from PCa in screened men compared to standard diagnosis.[9,10]

In the year after the USPSTF recommendation the AUA released recommendations suggesting that in a setting of shared decision making, men 55 to 69 years old should consider PSA based PCa screening. The AUA recommended against routine screening in men younger than 40 and older than 69 years, and concluded that there was insufficient evidence to recommend screening for men 40 to 54 years old. Despite the AUA guidelines the impact of the USPSTF recommendation was soon evident. The volume of patients seen in consultation for abnormal PSA findings decreased, particularly at institutions with widespread adherence to USPSTF recommendations.[11,12] The consequences of such a decrease may result in otherwise avoidable deaths due to PCa.[13] In this study we elucidate whether the characteristics of patients undergoing prostate needle biopsies and the PNB results changed at our center after the USPSTF recommendations.

METHODS

Patients

A retrospective cohort study with a historical control group was performed using data collected prospectively in an institutional review board approved database of patients undergoing transrectal ultrasound guided prostate needle biopsy. Patient demographics and biopsy characteristics were included for the first recorded PNB for each patient performed between September 10, 2004 and November 10, 2014. All PNBs included were performed by 1 of 2 attending urologists (JMC or CRP). Since 2006 a team of Virginia Mason pathologists led by a dedicated genitourinary pathologist reviewed all PNB specimens. PSA was categorized based on CAPRA score criteria[14] as patients with a PSA of 6.00 ng/ml or less, 6.01 to 10.00 ng/ml, 10.01 to 20.00 ng/ml, 20.01 to 30.00 ng/ml or greater than 30.00 ng/ml. Exclusion criteria were previous PCa diagnosis, no prior PSA test result, PNB performed during the USPSTF comment period (October 8, 2011 to May 24, 2012) and PNB with fewer than 10 biopsy cores. D'Amico risk[15] and CAPRA score were determined using previously published criteria.

Patient demographics, AUASS[16] and biopsy characteristics were compared between patients who underwent PNB in the 86 months before the USPSTF draft recommendation (September 10, 2004 to October 7, 2011, the pre-USPSTF group) and those who underwent PNB in the 30 months after the publication of the final recommendation (May 25, 2012 to November 10, 2014, the post-USPSTF group). To minimize potential confounding due to unrelated changes over time, a subset of the pre-USPSTF group selected from a period with comparable duration (April 7, 2009 to October 7, 2011, immediately pre-USPSTF group) was compared to the post-USPSTF group.

Statistical Analyses

Age (censored at 90 years), age category, AUASS ($\log_{10}$ transformed), clinical stage, PSA ($\log_{10}$ transformed), PSA category, Gleason category, D'Amico risk category and CAPRA score category were compared between groups

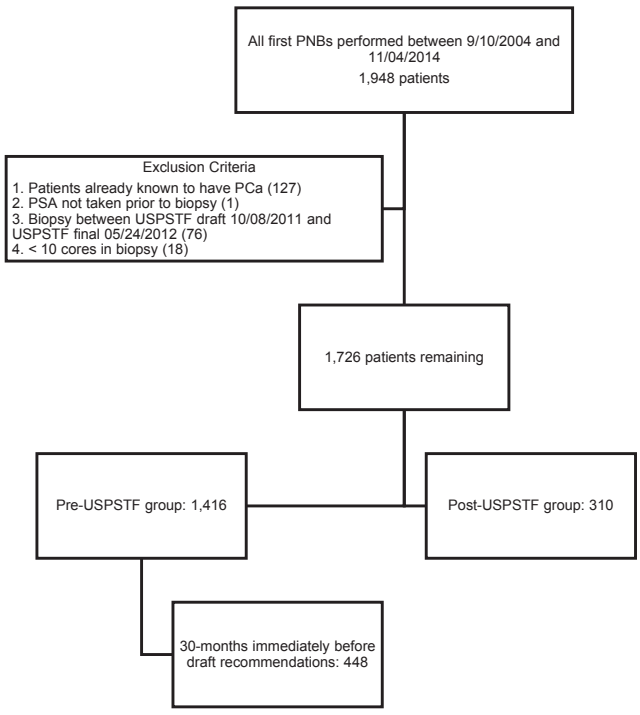

Figure 1. Patient inclusion and exclusion criteria