Screening for Prostate Cancer: Informing Men About Their Options

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The aging of the population and recent availability of screening tests have greatly changed the presentation and diagnosis of prostate cancer. Prostate cancer remains a significant public health problem, and controversy about screening recommendations is ongoing.

An estimated 232,090 men will be diagnosed with prostate cancer in 2005, and 30,350 men will die from the disease in 2005 (American Cancer Society [ACS], 2005). Prostate cancer accounts for 33% of new cancer cases in men, but current estimates suggest that 90% of the cases are diagnosed with only local or regional spread, for which the five-year relative survival rate approaches 100%. Minority men continue to be diagnosed with more advanced disease compared with non-Hispanic white men (ACS).

All men older than age 50 are at risk for developing prostate cancer. About 70% of all prostate cancer cases are diagnosed in men older than age 65 (ACS, 2005). Other known risk factors include being of African American descent, having a family history of prostate cancer, and having a long history of consuming a diet high in saturated fat.

The symptoms of prostate cancer are vague. Early prostate cancer usually is asymptomatic. Signs of more advanced malignancy include a weak or interrupted urine flow, difficulty urinating, more frequent urination, blood in the urine, or pain with urination. Continual pain in the lower back, pelvis, or upper thighs often is indicative of metastatic disease. Relying on symptoms is an ineffective means to detect prostate cancer early because the symptoms often are similar to the symptoms of prostatic hyper trophy and other benign processes.

The majority of cases of prostate cancer are discovered through combination screening with digital rectal examination (DRE) and serum prostate-specific antigen (PSA) testing. The decision to screen for clinically localized prostate cancer, particularly in older adults, is controversial. Screening is based on the hypothesis that early detection allows treatment of the cancer while it is localized, thereby reducing mortality. However, the hypothesis that early treatment reduces mortality is unproven in prostate cancer, especially in older adults (Fienta, Sandler, Hollenbeck, & Sandra, 2004). Screening cannot discern whether a cancer is indolent. Also, many older adults die from other medical complications before the spread of prostate cancer becomes symptomatic or difficult to manage.

The improved earlier detection of prostate cancer at an earlier stage is thanks in part to the widespread availability of screening using a combination of PSA testing and DRE. Much of the controversy involves the age at which men should start and stop screening as well as whether to screen. A comparison of guidelines is shown in Table 1.

Digital Rectal Examination

DRE is considered a standard screening tool for the early detection of prostate cancer. Research has examined the sensitivity and specificity of DRE and its role in the early detection of prostate cancer. Most experts concur that it is more difficult to detect prostate cancer when using DRE alone (Harris & Lohr, 2002).

The overall sensitivity of DRE is estimated to be about 59% (Harris & Lohr, 2002). The biggest benefit of DRE is that it may detect cancer in some men with normal PSA levels. In most cases, the tumors are small and well differentiated. The positive predictive value of DRE has been reported to range from 4%–11% in men with PSA levels of 0–2.9 ng/ml and from 33%–83% in men with PSA levels of 3.0–9.9 ng/ml or more (Basler & Thompson, 1998).

The main limitations of DRE are that the majority of palpable cancers are not early cancers and that many clinically important cancers are located in regions of the prostate gland that are inaccessible to digital palpation. Only the posterior and lateral aspects of the gland can be palpated. Although it has poor sensitivity, DRE often is recommended as one component of prostate cancer screening because it may detect cancers missed by other tests. Other commonly cited benefits are that it is a low-cost procedure, is generally well tolerated, and has value in evaluating other prostate abnormalities such as benign prostatic hyperplasia.

Prostate-Specific Antigen Testing

PSA testing became widely used for the screening and diagnosis of prostate cancer after its commercial introduction as a test to monitor recurrence in patients with cancer. The use of PSA testing initially resulted in a marked increase in prostate cancer incidence rates in the United States in the late 1980s. The trend peaked in 1992, and the pattern of rise and decline in incidence is consistent with the concept that upon introduction, PSA testing uncovered a large number of prevalent cancers that had accumulated as a result of previous years’ incidence. Once the cases were detected, incidence rates returned to the rate of newly occurring disease (Smith et al., 2001).

Measurement of serum PSA level is one of the primary means for detecting prostate cancer. PSA is a serum kinase produced by benign and malignant prostatic epithelial cells. The sensitivity of PSA testing has been reported to be 73%, with a greater
Table 1. Comparison of Guidelines for Prostate Cancer Screening

<table>
<thead>
<tr>
<th>Agency and Reference</th>
<th>Funding Source</th>
<th>Intended Users</th>
<th>Objective</th>
<th>Target Population</th>
<th>Outcomes Considered</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Academy of Family Physicians (2004)</td>
<td>American Academy of Family Physicians, a private group</td>
<td>Physicians</td>
<td>To provide recommendations that should be offered and offer guidance against interventions that should not be</td>
<td>Asymptomatic adults of average risk</td>
<td>Not stated</td>
<td>Prostate-specific antigen (PSA) testing: no recommendation because of insufficient evidence. Digital rectal examination (DRE): no recommendation because of insufficient evidence</td>
</tr>
<tr>
<td>American Cancer Society (American Cancer Society, 2005; Smith et al., 2001)</td>
<td>American Cancer Society</td>
<td>Physicians, nurses, and healthcare providers</td>
<td>To provide recommendations for the early detection of cancer in asymptomatic individuals</td>
<td>Healthy men older than age 50 with a life expectancy of 10 years</td>
<td>Effectiveness of screening test and morbidity and mortality associated with disease</td>
<td>PSA testing: annually beginning at age 50 in men with a life expectancy of 10 years. For men who ask a healthcare provider for a recommendation, screening should be chosen. DRE: annually with PSA. In men for whom DRE is an obstacle to screening, PSA still should be offered.</td>
</tr>
<tr>
<td>American Urological Association (2000)</td>
<td>American Urological Association, a professional organization</td>
<td>Physicians</td>
<td>To suggest recommendations for screening men at risk for prostate cancer</td>
<td>Men older than age 50</td>
<td>Sensitivity and specificity of PSA testing</td>
<td>PSA testing: men ages 50 and older with a life expectancy of at least 10 years, men ages 40 and older with a family history of prostate cancer, or men who are of African American descent. DRE: should be combined with PSA</td>
</tr>
<tr>
<td>Institute for Clinical Systems Improvement (2004)</td>
<td>Private, nonprofit organization</td>
<td>Advanced practice nurses, allied health personnel, healthcare providers, health plans, hospitals, nurses, physician assistants, and physicians</td>
<td>To identify preventive services with good or fair evidence for inclusion into a periodic health evaluation</td>
<td>Low-risk, asymptomatic adults ages 19 and older</td>
<td>Effectiveness of screening, effectiveness of education, and predictive value of screening tests</td>
<td>PSA testing: recommended for men ages 40 and older. DRE: recommended for men ages 40 and older</td>
</tr>
<tr>
<td>U.S. Preventive Services Task Force (Harris &amp; Lohr, 2002)</td>
<td>U.S. government</td>
<td>Advanced practice nurses, allied health personnel, healthcare providers, nurses, physician assistants, and physicians</td>
<td>To summarize the current U.S. Preventive Services Task Force’s recommendations</td>
<td>Adult males</td>
<td>Efficacy of screening in reducing mortality from prostate cancer, accuracy and reliability of screening tests in detecting prostate cancer, harms of screening, and costs and cost-effectiveness of screening</td>
<td>PSA testing: Discuss potential benefits and harms of PSA screening. Consider patient preferences. Not recommended for men with a life expectancy of less than 10 years. Begin at age 50 and in younger men from high-risk groups. DRE: no recommendation</td>
</tr>
</tbody>
</table>

Sensitivity for aggressive cancers (Harris & Lohr, 2002). About 20%–30% of tumors are missed when PSA is performed alone. Serum PSA levels less than 4 ng/ml are considered normal, levels of 4–10 ng/ml have a 25% positive predictive value for prostate cancer, and levels higher than 10 ng/ml have a 67% positive predictive value (Feneley & Partin, 2000). Thus, even at high levels, the test is not specific for prostate cancer. Specificity may be as high as 98% for men in their 50s but less than 80% for men in their 70s (Harris & Lohr). Other conditions (including benign prostatic hyperplasia, prostatitis, and recent prostate biopsy) also can elevate PSA levels. Because of the limitations in specificity, several newer approaches to PSA measurement and interpretation have been suggested.

The measurement of free instead of total PSA levels has been suggested to increase specificity. In general, prostate cancers are associated with less free PSA. Thus, free PSA levels of less than 15%–25% are an indication for biopsy. However, no standard percentage has been defined, and the range reflects individual investigators’ conclusions (Laguna & Alivizatos, 2000). The use of free PSA testing has fallen out of favor because of the costs and potential harms of further testing.
PSA for men with borderline PSA results could eliminate 20% of unnecessary prostate biopsies (Harris & Lohr, 2002).

PSA density (PSAD) is determined by dividing the PSA number by the prostate volume as measured by transrectal ultrasound (TRUS). It has the effect of adjusting for PSA elevation associated with benign gland enlargement. A higher PSAD indicates a greater likelihood of cancer (Laguna & Alivizatos, 2000).

Age-specific upper levels of normal of 4.5 ng/ml for men aged 60 and 6.5 ng/ml for men aged 70 have been suggested to try to reduce the number of biopsies with negative results (Carroll et al., 2001). PSA levels normally are higher in older men than in younger men, even in the absence of cancer. Cancers missed in older men using age-referenced norms, however, may be lethal, and the use of the procedure has not gained widespread acceptance (Pienta et al., 2004).

PSA velocity is the rate at which a PSA level rises over a period of time, and it has been proposed as another way to improve the specificity of PSA testing. It has not resulted in improved sensitivity or specificity (Pienta et al., 2004).

Although the variations in testing are being researched more, the evidence to date suggests that they offer only marginal improvements on basic PSA testing (Feneley & Partin, 2000). Most of the agencies and groups that make screening recommendations consider the limitations. The principal strengths and benefits of PSA testing are reasonable sensitivity, reasonable cost, and high patient acceptance. The principal drawback of the test is its imperfect specificity in differentiating malignancy from benign prostatic hyperplasia and prostatitis, and other benign conditions that might require no treatment being detected and managed in the same aggressive, potentially life-threatening cancers.

Combining Screening Modalities

Despite low specificity, an abnormal DRE result or elevated PSA level generally is considered an indication for TRUS-guided prostate biopsy. Thus, a positive DRE or PSA statistically will lead to a large number of TRUS findings that will prove to be negative.

Using TRUS for biopsies is not without risk. The procedure has few major complications but frequent minor complications, including bacterial infection (16%–53% without prophylaxis), bleeding (transient bleeding occurs in as many as 50% of biopsies), hematospermia (for two to three weeks), and pain (as many as 19% of men are unwilling to undergo a second biopsy because of pain) (Rodriguez & Terris, 2000).

Evidence supporting the effectiveness of PSA testing alone or in combination with DRE and TRUS is available from several sources (Harris & Lohr, 2002). Early comparative studies showed that the early detection of prostate cancer in asymptomatic men could be increased with a combination of PSA testing and DRE. In addition, the stage distribution of screen-detected cancers was much more favorable than that which occurred in the general, unscreened population. The ACS National Prostate Cancer Detection Project showed that after five years of annual testing by PSA, DRE, and, when appropriate, TRUS, 92% of cancers detected were localized to the prostate, compared to 66% in a national database covering men the same age (Smith et al., 2001).

Implications for Nurses

The ACS (2005) emphasized that all men should have the opportunity to learn about the potential benefits, risks, and limitations of each early detection tool for prostate cancer. Men also need to be instructed on the controversy surrounding the treatment of early prostate cancer and indolent prostate cancers. This is an area in which oncology nurses can offer clarification.

Screening recommendations often need to be modified for men at high risk. Thus, all men need accurate assessment of their risks for developing prostate cancer, including consideration of age, ethnicity, and pertinent family history. Only with this information can men make informed decisions.

Nurses should be aware of the potential adverse effects of screening. Men with abnormal screening results can experience heightened anxiety while waiting for the results of further diagnostic testing. Screening can lead to harm if indolent cancers are treated aggressively. Side effects of treatment, including erectile dysfunction, urinary incontinence, and bowel dysfunction, are relatively common after treatment and adversely affect quality of life. Presently, screening is not able to completely discern between indolent cancers for which little or no treatment is needed and more aggressive malignancies (American Urological Association, 2000). Men need to understand the potential limitations and risks associated with screening.

Oncology nurses must be able to explain the strengths and weaknesses of prostate cancer screening. Guidelines from various organizations as shown in Table 1 can provide some direction for nurses when they are making recommendations for and educating men about screening modalities for prostate cancer. Nurses should be continually aware of new research findings so that they can interpret them to men in understandable terms.

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References


