Preventive Medicine: Prostate Cancer

Prostate cancer in American men is one of the most common cancers. According to American Cancer Society statistics, there have been about 26,730 deaths as a result of prostate cancer, and the newly diagnosed cases are about 161,360. Prostate cancer, the third leading cause of death in American men, is seen in older men. The average age at which most of the cases are diagnosed is 66.

Screening for Prostate Cancer

Prostate cancer at the early stages does not usually show symptoms, and therefore, most of the prostate cancers are first found during screening tests. At a later stage, symptoms include having difficulty in starting urination, urinating frequently, having a weak or an interrupted flow of urine, as well as having traces of blood in the urine and semen. Two types of tests are used for screening purposes:

1. Digital rectal exam (DRE).
2. Prostate-specific antigen (PSA) blood test.

Digital rectal exam (DRE)
While performing a DRE, a lubricated, gloved finger is inserted into the rectum to check for any hard areas or bumps. Prostate cancer usually begins to develop in the posterior part of the prostate, and as the rectum is just behind the prostate gland, the digital examination can prove to be a useful way of detecting prostate cancers at an early stage.

Findings that suggest malignancy on digital rectal examination include:

- Prostate enlargement. If you can’t get above the gland then the size is most likely >70 g.
- Gland asymmetry.
- Median sulcus obliteration and cannot be felt.
- Fixity of prostate mucosa and the overlying rectal mucosa.
- Nodularity.
- Woody hard prostate.
- Tenderness on examination.
- Blood on the examining finger.

It is important to note that:

- The digital rectal exam is less effective than prostate-specific antigen testing.
- Since only the peripheral zone is accessible to digital rectal examination, tumors confined to the central or transitional zones may be missed, although the peripheral zone is the most common site.
- The examination might be painful if the individual has hemorrhoids; otherwise, it is a painless procedure which takes only a minute or two.

Prostate-specific Antigen (PSA)

PSA is an antigen formed by the normal and cancerous cells of the prostate gland. Mostly found in semen, PSA is present only in small amounts in the blood; thus, its
detection in blood may indicate excessive production.

Interpretation of PSA levels in the blood:

**Normal PSA:**

Less than 4 ng/mL for men without prostate cancer.

**Possible prostate cancer:**

PSA levels of more than 10 ng/mL increase the chances of having a prostate cancer by more than 50%; thus, it is considered as an arbitrary cut-off point for aggressive workup and follow-up.

The higher the PSA levels, the higher the risk for having prostatic cancer as shown:

- 0-4ng/L have a 5% risk.
- 4-10ng/L have a 20% risk.
- 10-20 ng/L have a 50-60% risk.
- >20 ng/L have a 70% risk.

In the grey zone of 4-10ng/L, then do the following to help differentiate cases as high risk or low risk:

**Ratio of free to total PSA level**

Obtained by dividing the Free PSA by the Total PSA. If it is >15%, then the likely diagnosis is BPE, while if the ration is <15%, then prostatic cancer is more likely since the carcinoma has less free PSA than BPE; thus, less ratio as PSA is bound to alpha-1-chymotrypsin and alpha-2-macroglobulin.

**PSA velocity**

Serial measurements done to determine the rate at which the PSA level rises per year. A rise by 0.67 ng/L or greater per year indicates malignancy is likely.

**PSA Density**

This is obtained by dividing the PSA level by the volume of the prostate. Even with the availability of several options, problems still arise from false positivity and negativity as with any other screening tests.

PSA levels are falsely elevated in the following situations *(False positives):*

- In prostatitis.
- After digital rectal examination.
- After sexual intercourse.

Almost 15% of men with PSA levels lower than 4 ng/mL are still diagnosed with prostate cancer on biopsy *(False negatives).*
Recommendations for Screening

It is important that gaps in knowledge on what could potentially lead to inappropriate PSA testing are sealed. There are more upcoming methods that can greatly improve PSA, but a lot needs to be done on them including magnetic resonance imaging and clinical decision rules. Currently, the risk: benefit ratio for PSA screening is worrying, especially given the categorization of ages to undertake it.

American Cancer Society (ACS) Recommendations for Prostate Cancer Early Detection

According to the ACS recommendations, the decision for screening should be made only after providing information on the risks and benefits of prostate cancer screening to the patient. The criteria for screening discussion for prostate cancer is given in Table 1.0.

<table>
<thead>
<tr>
<th>Age</th>
<th>Risk</th>
<th>Individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 years</td>
<td>Average risk</td>
<td>All men</td>
</tr>
<tr>
<td>Age</td>
<td>Risk</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>45 years</td>
<td>High risk</td>
<td>African Americans and other men who have a first-degree relative diagnosed with prostate cancer at an age younger than 65 years.</td>
</tr>
<tr>
<td>40 years</td>
<td>High risk</td>
<td>African Americans and other men who have more than one first-degree relative diagnosed with prostate cancer at an early age.</td>
</tr>
</tbody>
</table>

Age, however, is not the only decision-making factor for screening. The overall health of the patient is equally important to be considered. If prostate cancer is not found as a result of first screening, the time interval for future screening is as follows:

- PSA of < 5 ng/mL requires re-testing every 2 years.
- PSA equal to higher than 5 ng/mL requires re-testing every year.

Men, whose life expectancy is not more than a decade and have no symptoms of prostate cancer, should not be offered the screening tests as they are not likely to benefit.

**National Comprehensive Cancer Network (NCCN) Screening Guidelines**

The decision for a screening test is based on the baseline history of the patient and physical examination. Baseline history includes family history, medications, and a history of the prostate disease or a screening test performed prior to the present visit. The pros and cons of screening must be discussed with the patient. Digital rectal examination (DRE) is carried out before PSA testing.

If DRE yields normal results, the following criteria is to be followed:

- Baseline PSA testing if the man is between 45 – 49 years old.
- If PSA levels are below 1.0 ng/mL, re-testing is required at 2 – 4 year intervals.
- If PSA levels are equal to, or higher than 1.0 ng/mL, annual or bi-annual re-
testing is recommended.

- For patients who are 50 – 70 years old, normal DRE, and PSA levels are below 3 ng/mL, re-testing every 1 – 2 years is required.
- After the age of 75, the screening option is taken only for a few selected cases.

**American Urological Association (AUA) Screening Guidelines**

AUA recommends against the prostate-specific antigen (PSA) based screening for prostate cancer in the following groups:

- All men with a life expectancy of fewer than 10 - 15 years.
- Men who are less than 40 years old.
- Average risk men who are from the age group of 40 to 54 years.
- Men who are more than 70 years old.

For those men who are 55 to 69 years old, the decision to undergo PSA screening involves weighing the benefits and risks. The guidelines for the age group 55 to 69 years are based on weighing the pros and cons of PSA screening.

- Shared decision-making based on patients’ preferences.
- Those men who have had a PSA screening test based on shared decision-making should be retested every 2

**U.S. Preventive Services Task Force (USPSTF), American College of Physicians, and American Academy of Family Physicians** recommend against the prostate-specific antigen (PSA)-based screening for prostate cancer.

**Randomized Trials of prostate cancer screening**

**Prostate, Lung, Colorectal, and Ovarian (PLCO) Screening Trial** results showed that 76,693 men between 65 – 74 years in the U.S had prostate cancer. No difference in prostate cancer mortality in the screening group and the control groups was found. More cancer cases were detected in the screening group. There was 52% contamination of the control group, with prostate-specific antigen testing.

It is important to note that despite these recommendations, patients will always have their preferences and values; thus, it is important that they have access to the right information to make informed decisions. The cost for these testing and screening will also play a role in the decision that a person arrives at.

**European randomized study of screening for prostate cancer:**

160,000 men between 55 and 69 years had a prostate cancer. Statistically, significant reduction in prostate cancer mortality with screening is possible.

**Efficacy:** 1.28 deaths reduced per 1000 men. 27 cancers would have to be treated to prevent another death.

**Curative Treatment**

More than 90% of the diagnosed prostate cancer patients undergo curative treatment. The following are the curative treatments:
Radical Prostatectomy

Prostatectomy involves removing part or the entire prostate gland. Radical prostatectomy involves removing the entire prostate gland, as well as all the surrounding lymph nodes, from a man who has prostate cancer.

**It is either done by:**

- Open surgery which involves an incision at the lower abdomen.
- Laparoscopic surgery where special tools are inserted into the lower abdomen through small incisions and the tools remove the prostate.

A radical prostatectomy is an effective treatment option, but it results in urinary incontinence in up to 12% of the cases and erectile dysfunction in about 50% of the cases. It raises chances of bleeding, injury to the rectum and formation of cysts.
Radiation therapy

It is the application of high energy X-rays and other particles to kill cancerous cells.

Two types of radiation therapies are used for prostate cancer:

- **External beam radiotherapy (EBRT):** A machine without the body is used in radiation. It is the most expensive treatment compared to any other option.
- **Brachytherapy (seed implantation / interstitial radiation therapy):** Radioactive seeds are implanted into the prostate to offer radiation near the prostate and thus minimize the adverse effects of radiotherapy to other organs.
Radiation therapy results in erectile dysfunction in about 50% of the cases. There are also rare incidences of chronic loose stool and urethra strictures. It is also more expensive compared to prostatectomy and has more long-term side effects.

Men can generally prevent prostate cancer by leading healthy lifestyles. This includes increasing vegetables and fruits consumption, and reducing the amount of fat in one’s diet. Maintaining appropriate body weight and avoiding smoking is also a preventative measure for prostate cancer.

References


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