

Prostate Specific Antigen Assessment



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PSA is a glycoprotein produced by the prostate. It is secreted into the semen and is usually detected at low levels in the blood. It is found in bound (usual) and free forms. PSA has a half-life of two to three days. Several weeks must pass after an event to allow for accurate reassessment.

The 5 α -reductase inhibitors (dutasteride and finasteride) can lower PSA levels by 50% after 12 months of treatment.

Influencing factors

Epithelial cells of the prostate produce PSA but cancer cells secrete more. PSA is not cancer specific. There are multiple causes for PSA elevation (Table 1).

The 5 α -reductase inhibitors (dutasteride and finasteride) can lower PSA levels by 50% after 12 months of treatment.¹ Men who are to be treated with 5 α -reductase inhibitors need a baseline level and should be followed with serial PSAs (at least annually). If PSA does not

Manuel's case

Manuel, 65, was referred for erectile dysfunction. He was not bothered by his voiding pattern but did have a frequency of every 2 hours and nocturia 3 times. His medical comorbidities included coronary artery disease (requiring stenting), hypertension, dyslipidemia and he was an ex-smoker. His medications included a statin, ACE inhibitor and NSAIDs as needed for joint aches. He saw physicians infrequently.

Physical

- Slightly overweight man
- BP: 136/78
- Palpable but not distended bladder
- Digital rectal examination (DRE): moderate, benign, non-tender prostate

Labs

- Electrolytes normal
- Creatinine 98
- Urinalysis clear
- PSA 6.4

Diagnoses

Asymptomatic benign prostatic hyperplasia (BPH), elevated PSA for age, atherosclerotic vessel.

Initial plan

Trial of tamsulosin. Follow PSAs.

Turn to page 84 to see Manuel's follow-up.

decrease by 50% at 12 months, or if there is a rise in PSA, these men should be reviewed by a Urologist for possible occult cancer.

“Does a normal PSA mean no cancer risk?”

Table 1

PSA: what can elevate it?

- Large benign gland
- Cancer
- Inflammation
- Infection
- Excessive physical activity/perineal vibration
- Manipulation: cystoscopy, prostatic massage, biopsy
- Urinary retention
- Androgen supplementation
- Ejaculation
- Catheter in place

Manuel's case cont'd...

Follow-up

Manuel tolerated tamsulosin and was happier with voiding. PSA fell to 5.6 within 3 months. He continued on tamsulosin. PSA at 6 months post-treatment 6.0 despite being happy with voiding. PSA at 18 months post-treatment 8.7. PSA velocity calculated to be 2.06 ng/mL/year. DRE still benign. Manuel agreed to a transrectal ultrasound guided biopsy of the prostate. Prostate volume 42 g and PSA density 20.7. Cancer detected in both lobes with Gleason score 4+5. He opted to have a laparoscopic radical prostatectomy. PSA postoperatively is undetectable.

No. Small prostate cancers may have a normal PSA.

“Does an increased PSA mean cancer?” No. High levels of PSA could mean an increased risk for prostate cancer, or at least prostate disease. A referral to a Urologist is advised.

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What is normal?

Normal levels vary slightly depending upon the specific test used by a laboratory. Generally, an isolated PSA within 0 ng/mL to 4.0 ng/mL would not indicate an increased risk for prostate cancer. Eighty per cent of males with prostate cancer and 20% of benign prostatic hyperplasia (BPH) males will have PSAs > 4.0 ng/mL.

“How can you improve upon sensitivity for prostate cancer detection?” The goal is to reduce prostate cancer mortality but also to reduce unnecessary PSA testing and prostate biopsies. Use PSA thresholds based on age and race (Table 2) in addition to using PSA velocity, density and free PSA.

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PSA velocity

This measures the change in PSA levels over time. A series of at least 3 PSA must be obtained over 1.5 years. If the PSA increase is ≥ 0.75 ng/mL/year then there is a higher suspicion for prostate cancer.² Use PSA velocity for men with a slowly increasing PSA from normal baseline, or in men with persistently high PSA with negative biopsy.

PSA density

This value is calculated at the time of prostate ultrasound/biopsy. The quotient of PSA to

Table 2

PSA thresholds based on age and race

| Age range (years) | Asians* | Blacks* | Caucasians* |
|-------------------|---------|---------|-------------|
| 40-49 | 0-2.0 | 0-2.0 | 0-2.5 |
| 50-59 | 0-3.0 | 0-4.0 | 0-3.5 |
| 60-69 | 0-4.0 | 0-4.5 | 0-4.5 |
| 70-79 | 0-5.0 | 0-5.5 | 0-6.5 |

*Reference range (ng/mL)

Table 3

Use free PSA to help determine cancer risk

| PSA | Probability of cancer (%) | Percent Free PSA | Probability of cancer (%) |
|------------|---------------------------|------------------|---------------------------|
| 0-2 ng/mL | 1 | 0-10 | 56 |
| 2-4 ng/mL | 15 | 10-15 | 28 |
| 4-10 ng/mL | 25 | 15-20 | 20 |
| > 10 ng/mL | > 50 | 20-25 | 16 |
| | | > 25 | 8 |

prostate volume helps to distinguish PSA elevations caused by cancer or by BPH. A value ≥ 0.15 increases suspicion for prostate cancer.³

Free PSA

PSA circulates in the blood as a bound and free form. The higher the per cent free PSA, the lower probability of cancer⁴ (Table 3). Order free PSA in men with PSA between 4 and 10 (with a normal digital rectal examination)—in young men to push for a biopsy, in older men to avoid a biopsy.

When do I stop testing PSA?

When a patient's life expectancy is < 10 years or when a patient asks you to. 

References

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