

THE UROLOGY GROUP

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PSA & PROSTATE ULTRASOUND

The prostate is a gland which is part of the reproductive system. It makes a portion of the semen, which is the fluid that comes out at the time of ejaculation. The prostate forms the first part of the urethra which is the urinary channel that drains urine from the bladder to the outside through the penis. The prostate begins to enlarge in a benign or non-cancerous fashion (called benign prostatic hyperplasia or BPH) in almost all men beginning at the age of 40. As it does, it can block the urinary channel and may cause a change in the pattern of urination. While normal growth of the prostate affects most men, approximately 1 out of 10 men will develop cancer of the prostate. Currently, men are checked for prostate cancer with a digital rectal exam (DRE) and a PSA blood test. A digital rectal examination is an exam carried out by a doctor where a gloved finger is inserted into the rectum to palpate the prostate for abnormalities that may suggest the presence of cancer.

Since the early 1990's, a blood test called PSA has been available to help determine if prostate cancer is present. PSA stands for prostate specific antigen, which is a protein-like substance manufactured only in the prostate. The normal range for PSA is between 0 and 4. When the value is elevated above 4, it may be an early warning sign that prostate cancer is present. Currently, many doctors are checking the PSA on a regular basis. If elevated, further evaluation may be indicated.

PSA is not specific for prostate cancer. There are actually three common conditions which cause PSA elevation: BPH, prostatitis and prostate cancer. BPH or benign prostatic hyperplasia, is the normal enlargement of the prostate that occurs in most men once they reach the age of 40. Prostatitis, which is nonspecific inflammation of the prostate, is another common cause of PSA elevation and likely affects 1 out of 4 men.

When PSA is elevated, the next step depends on the degree of elevation. We may recommend regular periodic digital rectal examinations of the prostate in association with repeat measurements of the PSA. If the elevation increases over time, further studies are indicated. Alternatively, we may recommend an assessment of the prostate with transrectal ultrasound.

Transrectal ultrasound (TRUS) of the prostate is an imaging technique that provides a complete view of the prostate, allowing visualization of areas which cannot be felt on a digital rectal examination. TRUS is carried out in the outpatient setting with IV sedation (similar to a colonoscopy). An ultrasound probe is placed in the rectum. The size of the prostate can be measured. The prostate is inspected for irregularities. In some men, there may be "hypoechoic" areas that are suspicious for prostate cancer, however, in most men, there are not any areas that stand out as suspicious. The main value of ultrasound imaging of the prostate is that it allows very precise, systematic, grid-like, step-by-step sampling (biopsy) of the prostate. As many as 16 or more biopsies of the prostate are taken. These "core" samples are almost an inch long and extend from the back of the prostate through to the front. A needle, which is the same size as a needle used to take a blood test in the arm, is used to take the samples of the prostate. It is this orderly, sequential sampling that provides the most effective approach to determine if prostate cancer is present.

Complications are rare after biopsy of the prostate but include bleeding and infection. To minimize the risk of bleeding, patients are instructed to stop all aspirin or aspirin like compounds seven to ten days prior to the procedure. Patients who are taking a blood thinner (i.e. Coumadin) need to stop the medication five days prior to the procedure. To minimize the risk of infection, preventive antibiotics are given the day before, the day of and the day after the procedure. A Fleets enema is usually given the day of the procedure to empty the rectal area.

For patients who undergo ultrasound and biopsy and have benign findings, we recommend careful, ongoing follow up. Patients should have a follow up digital rectal exam and PSA in three to six months after their procedure and at regular six months intervals thereafter. In some cases even closer follow up may be recommended.

As experience with PSA has accumulated over time, further concepts have developed to increase its usefulness. An important feature of PSA appears to be its rate of change over time, referred to as "PSA velocity." For those men with BPH or prostatitis, the PSA may vary by several points a year but it tends to stay in the same range over time. For those men with prostate cancer, the PSA tends to have a steady rise and the levels can increase by as much as 50 to 100% on a yearly basis.

The level of PSA can also be correlated to the size of the prostate. The "PSA density" is the value of PSA divided by the size of the prostate measured at the time of prostate ultrasound. If the level of PSA is higher than expected for that size prostate, then there may be an increased possibility that prostate cancer may be present.

Another variation of PSA testing is known as "free versus total" PSA. A portion of the PSA in the bloodstream is bound to a carrier protein and the remainder is unbound or "free." The ratio of the free versus total PSA may be useful to help determine if PSA elevation is due to BPH or prostate cancer. If the % free is near 10%, there is increased concern that cancer may be present.

Finally, different PSA levels have been established for different age groups. The current normal ranges for PSA according to age are as follows:

41-50	-	0.0-2.5;
51-60	-	less than 3.5;
61-70	-	less than 4.0;
Over 70	-	less than 6.5

We have been doing transrectal ultrasound since 1991. This has led to the diagnosis of prostate cancer in many of our patients. The encouraging news is that many of these prostate cancers tend to be diagnosed at an early stage, when they are still confined within the prostate and have not spread. This is the stage at which prostate cancer is most curable. In the past, prostate cancer was typically diagnosed once it had already spread from the prostate, in which case treatment was less effective. Our current recommendation is that all men over the age of 50 have a digital rectal examination and PSA test on a yearly basis. If an abnormality is detected in either instance, further evaluation with transrectal ultrasound imaging should be carried out.