

The PSA Test

By Kalli Spencer

Prostate specific antigen (PSA) is an enzyme produced only in the prostate and acts on a protein in semen called seminogelin to give the semen a more liquid consistency. PSA shows up in the blood when sampled. Prostate cancer can raise the level of PSA in the blood but so can age related prostate enlargement causing trouble with urination (benign prostatic hypertrophy); infections (prostatitis); surgical procedures (prostate biopsy, cystoscopy) and natural increase with age. The PSA level may be reduced in those men taking medications such as dutasteride or finasteride (to treat benign prostatic hypertrophy), when testosterone levels are low (for those taking androgen deprivation therapy), following a prostatectomy or radiation therapy.

There are several different laboratory assays that can measure PSA and the reference values may vary between labs. It is always advisable to refer to the reference values for the laboratory where a blood test is done. The “normal” range for PSA for those aged between 40-49 is 0-2.5; up to 3.5 for ages 50-59; up to 4.5 for ages 60-69 and up to 6.5 for ages 70-79. These “normal” reference values may also vary according to ethnicity. It is important to note that prostate cancer can be present at any level, even very low PSA levels (which can happen in advanced prostate cancer or specific prostate cancer sub-types). Examination of the prostate by a specialist can improve detection rates of cancer in combination with PSA testing.

An important point to note about the interpretation of PSA testing is the trend of successive readings. Of interest would be the rate at which the PSA rises and by how much. This is particularly important for those being monitored on active surveillance. PSA velocity is sometimes used by the treating specialist to determine if a rise in PSA is significant and of concern. A formula is used to determine PSA velocity on at least three PSA levels taken at least 6 months apart.

By using the size of the prostate determined by a volume measurement on ultrasound, PSA density can be calculated and used as another marker to suggest whether prostate cancer is present or not.

If there is diagnostic uncertainty, some specialists like to aid their decision making by using the Prostate Health Index. This is also a blood test that measures different components of PSA in the blood to determine the risk of prostate cancer.

PSA is an important diagnostic test but it can also be used to measure response to treatment. This is often spoken about in terms of recurrence. Biochemical recurrence refers specifically to a rise in PSA after primary treatment (surgery, radiation or focal therapy). This may indicate a sign of relapse. Local recurrence refers to cancer identified within the prostate (after ablation or radiation) or at the site where the prostate was before a radical prostatectomy (i.e the point where the bladder is reconnected to the urethra or prostatic bed/fossa). Distant or systemic recurrence refers to cancer detected in distant organs (such as bone).

Monitoring for recurrence after radiation therapy is complex as the prostate is still in-situ and the PSA levels may fluctuate. After a radical prostatectomy the PSA is expected to be undetectable. At 6 weeks after surgery a PSA > 0.2 is suspicious for recurrence and an increasing trend in measurements over time is highly suggestive. Imaging such as PET/CT Scan may help confirm the diagnosis. The PSA doubling time is a formula calculated by the laboratory and helps determine whether a recurrence is more likely to be local versus systemic.

Researchers are currently developing tests that examine the patient's individual genetics to look for susceptibility to develop prostate cancer, the type of cancer present and what treatment modalities the cancer will respond to¹. Urine (PCA3 test) and even semen are being used as alternative sample mediums to make a diagnosis^{2,3}. For now though, the PSA blood test is still the best and most widely available test we have for making a diagnosis and monitoring treatment outcomes.

References

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About the Author

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Kalli is an internationally renowned Urological Surgeon, specialising in oncology and robotic surgery. He trained and worked in South Africa, before relocating to Australia where he has worked at Macquarie University Hospital and Westmead Hospital. His passion for what he does extends beyond the operating room, through public health advocacy, education and community awareness of men's health, cancer and sexuality.

Kalli has been involved with the Prostate Cancer Foundation of Australia for many years, advocating for improved cancer care and facilitating community prostate cancer support groups.