

## The effect of ejaculation on serum total and free prostate-specific antigen concentration

**To the Editor:** The editorial of Grammaticos P. in *Hell J Nucl Med* 2004 [1] although contains important information about the diagnostic procedure for prostate cancer by using repeated measurements of serum total prostate-specific antigen (PSA) and free PSA levels, does not discuss the possible influence of ejaculation on serum PSA levels. This subject is almost absent nowadays from medical literature. Published results related to the effects of ejaculation on serum PSA levels are controversial. Some researchers have reported that serum PSA increases after ejaculation [2,3]; others have reported that in young men serum PSA decreased [4]; while others have reported that no change occurs [5,6]. Because serum PSA values depend on PSA production by the prostatic epithelium and on the ability of PSA to enter the circulation through physiologic barriers, consisting of acinar basal cells, epithelial and capillary basement membranes, and capillary endothelial membrane, it is believed that a weakening or atrophy of these barriers due to aging or a ductal obstruction caused by benign prostatic hyperplasia, could lead to increased barrier permeability and further enhance leakage of PSA during ejaculation [3]. However, an accurate understanding of the effect of ejaculation on serum PSA, especially in men older than 50 years who are at greater risk for prostate cancer, is important and it is advised that these men should routinely undergo serum PSA testing. There are many factors that may improve the accuracy of serum PSA testing like: serum free (non-complexed enzyme) PSA, the ratio of free to total PSA, the PSA velocity index (the rate of change in PSA levels from one year to another), the PSA density (the quotient of serum PSA concentration divided by the prostate volume as determined by transrectal ultrasonography) and patient age [1,2,7]. The following experience of ours may be of some interest:

We have examined a 52-year-old asymptomatic Greek subject who in an annual routine blood test had a serum total PSA of 6 ng/ml. His personal and family medical history was unremarkable. There was no history of using drugs, or having symptoms of benign prostate hypertrophy, prostate cancer or prostatitis, and he had no recent diagnostic clinical tests of the genitourinary tract. The patient refused digital rectal examination. An abdominal and prostate ultrasound scan showed no evidence of benign prostate hyperplasia or of prostate cancer. Serum total PSA after ten days was 5.2 ng/ml, but the percent free PSA was 27% (normal > 20%) [8]. After a month, serum total PSA value was 1.2 ng/ml. In another blood test after 3 months, serum total PSA value rose to 7 ng/ml with a percent free PSA of 40%. The urologist recommended a transrectal ultrasound-guided prostate biopsy. The patient refused biopsy. All serum PSA measurements were performed with the same radio-immune assay (RIA) in a nuclear medicine laboratory (Tandem-R PSA, Hybritech Inc., USA) with normal range 0-4.0 ng/ml. The percent free serum PSA was calculated as the ratio of serum free PSA to total PSA multiplied by 100. After discussing this situation with the patient, we were informed that he had sexual activity and ejaculation in less than 24 hours before the first and before the last serum PSA measurements (being 6 and 7 ng/ml respectively). Ejaculation might have had an effect on serum PSA levels in our patient. All other values of serum total PSA measurements performed at least 4 days after sexual abstinence were < 1.2 ng/ml.

The identification of factors besides prostate cancer that may cause an increased serum total PSA level, such as ejaculation, seems to be important. We suggest a 48h period of abstinence prior to total PSA measurement and also to measure free serum PSA. The potential clinical benefits to be derived from instituting such abstinence are dual [3]. First, to avoid a factor that could falsely elevate serum PSA. Second, a number of unnecessary prostate biopsies could potentially be avoided. Such a clarification of abnormal serum PSA levels carries significant emotional, clinical, and economic impacts. A careful counselling related to the above should be given before suggesting a serum PSA test to the patient. Controlled studies including the concentration of total and free serum PSA in the semen, and also studying men at risk, are needed to clarify the true influence of ejaculation on total and free serum PSA concentrations.

### Bibliography

1. Grammaticos P. Diagnostic and prognostic value of serum prostate specific antigen in prostate carcinoma. *Hell J Nucl Med* 2004; 7: 146-148.
2. Herschman JD, Smith DS, Catalona WJ. Effect of ejaculation on serum total and free prostate-specific antigen concentrations. *Urology* 1997; 50: 239-243.
3. Tchetgen MB, Song JT, Strawderman M et al. Ejaculation increases the serum prostate-specific antigen concentration. *Urology* 1996; 47: 511-516.
4. Simak R, Madersbacher S, Zhang ZF, Maier U. The impact of ejaculation on serum prostate specific antigen. *J Urol* 1993; 150: 895-897.
5. Netto NR, Apuzzo F, de Andrade E et al. The effects of ejaculation on serum prostate specific antigen. *J Urol* 1996; 155: 1329-1331.
6. McAleer JK, Gerson LW, McMahon D, Geller L. Effect of digital rectal examination (and ejaculation) on serum prostate-specific antigen after 24 hours. *Urology* 1993; 41: 111-112.
7. Benson MC, Whang IS, Olsson CA et al. The use of prostate-specific antigen density to enhance the predictive value of intermediate levels of serum prostate-specific antigen. *J Urol* 1992; 147: 817-821.
8. Catalona WJ, Smith DS, Wolfert RL et al. Evaluation of percentage of free serum prostate-specific antigen to improve specificity of prostate cancer screening. *JAMA* 1995; 274: 1214-1220.

**Elias E. Mazokopakis<sup>1</sup>, MD, PhD, Antony G. Batistakis<sup>1</sup>, MD, and Ioannis K. Starakis<sup>2</sup>, MD, PhD**

*Department of Internal Medicine,*

1. *Naval Hospital of Crete, Chania, Greece,*
2. *Patras University Hospital, Rion-Patras, Greece*

**Elias Mazokopakis, MD, PhD**

Iroon Polytechniu 38A, Chania 73 132, Crete, Greece,  
Tel.: +302821 0 82754, Fax: +302821 0 89307  
E-mail: emazokopakis@yahoo.gr