Effect of ejaculation on serum prostate specific antigen level in screening and non-screening population

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INTRODUCTION

Currently most prostate cancers are diagnosed through screening with digital rectal examination (DRE) and measurement of serum prostate specific antigen (PSA). The serum PSA level correlates with prostate cancer risk, aggressiveness, outcome of treatment, and patients monitoring for tumor recurrence. The serum PSA levels are increased in different clinical conditions including benign hyperplasia, prostatitis, and prostate cancer. For the first time in 1991 PSA was reported as a first line test for prostate cancer screening. In 1994 food and drug administration approved measurement of serum PSA level as an index of early detection of prostate cancer, with a threshold of 4.0 (ng/ml). PSA is relatively sensitive, but not specific for detection of prostate cancer. Unnecessary prostate biopsy may be carried out due to false-positive high titres of PSA. This would adversely affect both patients’ emotional well-being and the cost-effectiveness of health-care resources. It is very important to identifying the factors that spuriously affect PSA levels serves to maximize the accuracy of screening and early detection of prostate cancer, increase detection rates, and lower false-positive rates for PSA testing. Several strategies have been used to increase the specificity of PSA as a screening test of prostate cancer such as measurement of PSA velocity, free PSA measurement, PSA density, and age specific reference ranges. Several clinical conditions can cause rising in serum PSA level such as Benign prostatic hyperplasia (BPH), infection, inflammation, instrumentation, prostate surgery, and prostatic adenocarcinoma.

Although, some authors have shown no significant effect of ejaculation on serum PSA level. Tchetgen et al. reported a mild increase in PSA (0.4 ng/ml) at 1 h after ejaculation, which decreased to 0.1 ng/ml by 6 h and reached to baseline by 24 h. Westphal et al. and Simak et al. reported a decrease in the serum PSA level 1 day after ejaculation. Because of controversial results of previous studies, the aim of our study was to the impact of ejaculation on the serum PSA is controversial. The aim of our study was to evaluate the relation of ejaculation and the levels of serum PSA on a prostate cancer screening population (over 50 years old) and non-screening men (less than 50 years).

MATERIALS AND METHODS

This study was approved by Ethical Committee of Shahrekord University of Medical Sciences. In this...
cross-sectional study, 35 healthy voluntary men below 50 years (non-screening male) and 25 healthy voluntary men above 50 year old (screening male) selected based on convenient sampling method in out-patient Urology Clinic of Hajar hospital, Shahrkord during the year 2009-2011. After history taking, physical examination and identical lower urinary tract symptoms score (American Urologic Association Score = AUA), three blood samples were taken and coded. First sample before ejaculation, the second sample 1 h after ejaculation and third sample, 24 h after ejaculation were taken. Serum PSA level and semen analysis were carried out in one laboratory by commercially available enzyme-linked immunosorbent assay kit for PSA. No participant had manipulation, needle biopsy, and massage of the prostate gland, acute prostatitis, urethral catheterization or urinary retention just before sample taking. No one had ejaculation 3-5 days before study. Patients with azospermia, severe oligospermia, coagulation liquefaction problems, and pyospermia were excluded. Data from questionnaire, check-list, lab finding and PSA changes, 1 h and 24 h post-ejaculation compared with pre-ejaculation were analyzed by Mann-Whitney test, Friedman test, and for correlation with AUA score Spearman coefficient of correlation test using of SPSS (version 16). This analysis has been carried out because of high positive skewness of data. P values less than 0.05 was considered significant.

RESULTS

In this cross-sectional study 60 voluntary men in two age groups were enrolled. The age group of less than 50 years (first group) included 35 men with an age range of 18-48 and mean age of 31.3 ± 8.6 years old and the age group of 50 years and higher (second group) included 25 cases with a mean age 56.9 ± 5.1 years (50-66 years). Mean AUA score of first and the second group were 2.2 ± 0.51 and 7.5 ± 5.9 respectively. The AUA score of the first group was significantly lower than the second group (P < 0.05). The result of PAS during the study was shown in the Table 1. Furthermore, the percentiles of PSA of all patients were shown in Figure 1. Based on the graph in Figure 1, one can conclude that for low and intermediate value of PSA, there was not any difference on 3 measurements, but in upper value, especially on five’s tail upper percentage of PSA, the difference between three measurements exist, such that at 1 h after ejaculation the upper value of PSA are higher than upper value of PSA at before ejaculation and 24 h after ejaculation. The Mann-Whitney test was showed a significant difference in serum PSA of two patients group (P < 0.05), with lower serum PSA in patients of the first group. The serum PSA levels were increased by more than 4 ng/ml, 1 h after ejaculation, but returned to baseline after 24 h. There was a significant difference between serum PSA before and 1 h after ejaculation in the first group. The Friedman test with following Dunns multiple comparison test was showed that in first patients group, there was not any difference between PSA before and after 24 h of ejaculation. Based on above tests, in the second group, there was a significant difference between serum PSA before and after 1 h of ejaculation, but there was no any difference between serum PSA before and after 24 h of ejaculation. Furthermore, there was a significant difference between serum PSA of one and 24 h after ejaculation [Table 1].

Spearman coefficient of correlation was showed a positive correlation between PSA in all stage and AUA score in the second group, but there were no such correlation in the first group [Table 2]. Furthermore, the change of PSA until 1 h was correlated with AUA score in the second group [Table 2].

DISCUSSION

There is a controversy about the effect of ejaculation on serum PSA in previous studies.[5,6,8-12] The results of our study showed that there is a significant increase in the serum PSA level 1 h after ejaculation both in the screening population (over 50 years old) and non-screening population (less than 50 year old men). These significant

![Figure 1: Percentiles of prostate specific antigen for all patients of three measurements](image-url)

![Table 1: Serum level of PSA during the study based on age group (ng/ml)](table-url)
changes are more common in cases with high AUA score of prostatism symptoms. There was no significant change in serum PSA levels 24 h after ejaculation with basal PSA level in both groups.

Some researchers suggested that PSA in the blood, 1 h after ejaculation, would substantially decline; however, even if with ejaculation PSA source completely would be emptied and PSA leakage into blood tends to be zero, this decrease should be applied through blood metabolization and it is not acceptable that PSA would decline in the blood (after 1 h) because of its half-life.

Our findings showed that there is a significant correlation between baseline serum PSA and amount of increasing titer of PSA, which it means that in higher titers of PSA, greater changes occur. Clinically, significant change in serum PSA occurred in 2 out of 25 (8%) voluntary patients (more than 50) who had pre-ejaculation serum PSA level less than 4 mg/ml and post-ejaculation greater than 4 mg/ml. This significant clinical change was not seen in non-screening population. Based on Catalona’s study, if baseline PSA threshold decreased from 4-2.5 ng/ml, the impaction of ejaculation on serum PSA would become clinically more significant. However, the frequency of ejaculation in men older than 50 years are lower than younger men, so clinical significance of ejaculation effect in this population is less important than men younger than 50 years.

It is believed that ejaculation in men 30-40 years old or younger could effect on serum PSA with no significant change in PSA or significant decrease in serum PSA. However, in 50 years and older men, in which PSA testing is primarily used for early detection of prostate cancer, ejaculation could lead to an increase in PSA which could elevate false-positive.

Results of our study were similar to the Tchetgen’s study, which contraction of pelvic muscles and periprostatic tissue may increase the leakage of PSA into the blood stream during ejaculation. This leakage was prominent in patients with lower urinary tract obstruction symptoms and high AUA score.

**CONCLUSION**

There was a significant relationship between ejaculation and the levels of serum PSA in screening and non-screening patients. However, in non-screening men significant rising of PSA after 1 h of ejaculation was not important clinically (not achieve to greater than 4 ng/ml). Taking a history of ejaculation in men older 50 years especially, with high AUA score could prevent false positive results and subsequent un-necessary work-ups.

**REFERENCES**


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