

The Effect of Cystoscopy on PSA Levels in Patients with Urologic Diseases

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Abstract

Background and Aims: There is controversy on change of Prostate specific antigen (PSA) levels after some urological procedures such as cystoscopy. In this study, we evaluated the effect of cystoscopy on PSA levels in patients with urologic diseases.

Methods: In a before-after study, 190 patients with urologic diseases such as relapsing urinary tract infection (UTI), urinary incontinency, hematuria, transitional cell carcinoma (TCC) follow up, DJ catheter removal and urinary retention were investigated. PSA levels were measured before and after cystoscopy.

Results: Mean age of patients was 63 ± 13 years. Mean duration of procedure was 2.5 ± 1.2 minutes. Total PSA level increased in all groups after cystoscopy. More changes were found in patients with urinary retention ($P < 0.01$). There was a relation between patients' ages and primary and secondary PSA levels ($P = 0.0001$). Moreover there was a statistically significant direct relation between the PSA levels and the duration of procedures in different groups of patients ($P = 0.001$).

Conclusions: Total PSA increases after cystoscopy and the level of PSA is higher in patients with urinary retention and change in level of PSA was higher in these patients. The results can have implications for the screening for prostate cancer patients.

Keywords: PSA, Cystoscopy, Urologic Diseases

Introduction

Prostate specific antigen (PSA) has become the most useful tool for detecting, staging and monitoring prostate cancer in the past decade (1). It is one of the most important tumor markers in oncology (2, 3). However, it has a lack of specificity in detecting prostate cancer, as using the most widely applied cut-off level of 4.0 ng/ml will result in an

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approximate cancer detection rate between 25-33% for transected ultrasound-guided biopsies (4). It may be elevated in patients with prostate cancer, benign prostatic hyperplasia (BPH), infection, abscesses, infarction, after prostatic needle biopsy, post digital rectal examination (DRE) and in some cases due to undetermined circumstances (5-10). However, few researches have shown that PSA level doesn't change after procedures such as cystoscopy or DRE (5, 6). In this study, we assessed PSA level changes after cystoscopy in relation to patients' individual characteristics such as age and reason for admission.

Materials and Methods

During 2-year period, between April 2006 and June 2008, a series of 190 men (mean age 63 ± 13) were enrolled in this before-after study. The patients were admitted in Hashemi Nezhad hospital's urology clinic and for urologic reasons such as hematuria, urinary retention and urinary incontinency. In patients with relapsing urinary tract infection and known cases of transitional cell carcinoma of bladder that were admitted for their follow up, flexible cystoscopy was carried out. Exclusion criteria were either catheterization or indwelling urethral instrumentation in the previous 6 weeks or symptoms of prostatitis. Patients with urinary retention who were suspected of neurogenic bladder were included in this study. Voiding cystourethrography (VCUG) has done in all patients in this study. Blood samples were taken immediately before and one hour after flexible cystoscopy. Flexible cystoscopies were performed by the same clinician with number 17-French cystoscope after lubricating the urethra with 11 ml of lidocaine/chlorhexidine gel in our day surgical unit. The total PSA (t-PSA) was measured using a PSA assay (Bayer diagnostics, Newbury, UK).

Statistics

Data were shown as means \pm SD. SPSS 15.0 (SPSS Inc., Chicago, IL, USA) was used for statistical

analysis. The statistical significance of differences between means of PSA Levels was determined by student's t-test analysis and paired t-test was used to compare levels before and after the manipulation. Significance was defined as $P < 0.05$.

Results

The mean \pm SD of age in patients were 63 ± 13 years. Ninety-five patients (50%) were more than 65 years old and 95 cases (50%) were less than 65 years old. The reason for patient's admission was in 80 cases (42.1%) hematuria, 35 cases (18.4%) urinary retention, 25 cases (13.2%) urinary incontinence, 20 cases (10.5%) known case of transitional cell carcinoma of bladder that were admitted for their follow up, in 15 cases (7.9%). Relapsing urinary tract infection was the reason of admission and in 15 cases (7.9%) for removal of Double J (DJ) catheter. All the patients underwent flexible cystoscopy with the mean duration of procedure was 2.5 ± 1.2 minutes. The mean of patient's Primary t-PSA level were 1.55 ± 1.04 , min: 0.3 –max: 4 ng/ml, the mean change of PSA levels after cystoscopy were 0.62 ± 0.99 a range from -0.4 to 5.5ng/ml and after cystoscopy, t-PSA was found increased in all groups significantly ($P=0.001$). Ninety-five patients (50 %) of our cases had age 65 years and more, 95 patients (50 %) of our cases had less than 65 years. The mean PSA level were more in the age group that was more in older group (2.02 ± 0.56 vs. 1.14 ± 0.78 , $P=0.03$) There was a statistical significance of direct relation between the PSA levels and the duration of procedures of patients ($P=0.001$), not only the average of t-PSA levels was more in patients with complaints of urinary retention before the cystoscopy compared with other groups but also increase of t-PSA was more than other groups of patients after the procedures (1.5 ± 0.8 vs. 0.63 ± 0.68 , $P=0.001$). Patients with urinary retention had the most significant change in PSA levels after cystoscopy when compared to other patients ($P=0.001$). It shows that the changes in PSA levels

Table 1. Comparison of PSA levels before and after cystoscopy in patients with different chief presenting complaints

Method of treatment	Patient Number and Percent	Mean Initial PSAsurvival(month)	Mean Secondary PSA	Mean Change PSA	Compare change in PSA to other patients
Relapsing UTI	15 (7.9%)	1.63 (SD= 0.46)	2.26 (SD= 0.562)	0.63 (SD= 0.68)	P=0.06
Urinary incontinency	25 (13.2%)	0.84(SD=0.357)	0.92 (SD =0.37)	0.80 (SD= 0.29)	P=0.01*
Hematuria	80 (42.1%)	1.42 (SD=0.996)	1.54 (SD= 1.105)	0.39 (SD= 0.38)	P=0.01*
TCC Follow Up	20 (10.5%)	1.32 (SD= 0.81)	2.1 (SD= 0.87)	0.77 (SD=0.58)	P=0.07
DJ Catheter Removal	15 (7.9%)	1.3 (SD=0.0845)	1.466 (SD =0.39)	0.16 (SD =0.48)	P=0.053
Urinary Retention	35 (18.4%)	2.45 (SD= 1.03)	3.97 (SD=1.63)	1.51(SD =1.83)	P=0.001*
Total	190(100%)	1.55 (SD=1.044)	2.17 (SD =1.48)	0.62 (SD= 0.99)	P=0.03*

PSA, Prostate Specific Antigen; UTI, Urinary Tract Infection; SD, Standard Deviation.

* Statistically Significant

are different in various urologic diseases and the difference between patients of each group to other patients is shown in Table 1.

Discussion

PSA is the main indicator in the diagnosis of prostatic cancer, evaluation of its present stage and follow up after the treatment (11). PSA enters the blood stream after rupture of the basement membrane which causes its release into the surrounding capillaries. Any manipulation of the prostate substantial enough to rupture this membrane can cause significant release of PSA into the circulation and interfere with the interpretation of the PSA level (12). Inflammation, BPH and trauma can increase PSA levels as well (10, 13-15). But there is no agreement on the interrelation of PSA level and trauma. Tchegen (1997) (8) reported that PSA values quadrupled after cystoscopy whereas Lynn (2000) (4) reported minimal changes. However, it is also reported that the level of PSA after cystoscopy is reliable (10, 16). In this study we demonstrated a statistically significant increase in serum

total PSA. The mean change in PSA after cystoscopy was 0.62 ng/ml (SD=0.99) in our study. Long (2006) also reported a mean PSA change of 0.1 ng/ml after flexible cystoscopy (16). Moreover, by the results of our study, higher blood PSA levels were seen in patients with urinary retention. It can be due to presence of BPH in these patients. The higher levels of PSA in these patients were followed by a higher change in PSA level after cystoscopy. Mean change in PSA level in these patients was statistically higher when compared to other patients.

Mean PSA level after cystoscopy in patients with urinary retention was 3.97 (SD=1.63) and this level of PSA made a suspicion of prostate cancer and can interfere with screening test of this cancer.

Conclusions

PSA levels change after cystoscopy. This change in level of PSA was higher in patients with urinary retention. More accuracy is needed in evaluation of PSA for screening the patients after cystoscopy especially those with urologic diseases such as

urinary retention.

Conflict of Interest

None declared.

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