Original Article

The effect of antibiotherapy on high serum PSA levels

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Abstract. This study investigated the effect of antibiotics in patients with PSA value high than 4 ng/mL on tPSA, fPSA and fPSA/tPSA ratio without missing cancer and avoiding unnecessary biopsies.

A total of 96 patients were included into the study with detected high level than 4 ng/mL serum PSA. Patients were divided into 2 groups according to the high level of PSA value. Group 1 included 49 patients with PSA level between 4-10 ng/mL. Group 2 included 47 patients with PSA level higher than 10 ng/mL. Patients were treated with Ciprofloxacin (500mg b.i.d.) orally for 2 weeks. All patients' PSA levels were evaluated and analyzed before and after antibiotic treatment. Statistical analyses were performed with SPSS version 18. A p value <0.05 was considered as significant.

The mean age was 61.6 ±5.7 (51-75) years in group 1 and 63.1 ±8.7 (55-74) years in group 2. Suspicious DRE findings were significantly high in group 2. The mean tPSA values were 6.82±0.42 and 5.93±0.36 before and after antibiotic treatment in group 1 respectively. There was no significant differences in tPSA value before and after antibiotic treatment in group 1. The mean tPSA values were 32.53±8.23 and 11.72±5.61 before and after antibiotic treatment in group 2 respectively. The mean tPSA value decreased significantly after antibiotic treatment in group 2. Prostate cancer was detected in 32 patients after TRUS guided prostate biopsy. Prostate cancer was identified in 13 patients in group 1 and 19 patients in group 2.

Antibiotic treatment in patients with PSA levels higher than 10 ng/mL is effective on prostate biopsy decision and antibiotic treatment can prevent unnecessary prostate biopsies.

Key words: Prostate, cancer, PSA, biopsy

1. Introduction

Prostate cancer is the most common cancer in men and prostate-specific antigen (PSA) is the most potent serum marker for diagnosis of prostate adenocarcinoma (1). PSA is an organ-specific marker but it is not specific to cancer. PSA level also increase including aging, trauma, ejaculation, benign prostatic hyperplasia, acute prostatitis, digital rectal examination, prostatic massages, prostate biopsies and transurethral procedures (2,3). Approximately 80% of patients with a normal digital rectal examination (DRE) have negative needle biopsy results for prostate cancer in PSA values between 4 and 10 ng/mL (4). PSA density (PSAD), PSA velocity and free/total PSA (f/t PSA) ratio give hints us to evaluate cancer specificity of PSA and avoid unnecessary biopsies in patients with a PSA value between 2.5 and 10 ng/mL (2).

Some antibiotics especially quinolones use to decrease high PSA level in patients with prostatitis. According to several studies antibiotic treatment, before deciding to have a biopsy can decrease PSA levels to normal and prevent the unnecessary biopsies (5).

This study investigated the effect of antibiotics in patients with PSA value higher than 4 ng/mL on tPSA, fPSA and fPSA/tPSA ratio without missing cancer and avoiding unnecessary biopsies.

2. Material and methods

A retrospective analysis of patients' data was performed. A total of 96 patients who were candidates to biopsy were included into the study with serum PSA levels higher than 4ng/mL. Exclusion criteria were acute urinary infection,

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Received: 25.03.2014
Accepted: 13.04.2014

acute urinary retention, documented history of prostatitis, rectal examination, cystoscopy, urethral catheterization and rectal endoscopic procedures. A standard investigation protocol that included prostate specific antigen (PSA), International Prostate Symptom Score (IPSS), quality of life (QoL) score, uroflowmetry measuring the maximum urinary flow rate (Qmax) and average urinary flow rate (Qave), Transrectal ultrasound scan (TRUS) measuring prostate volume and postvoiding residual urinary volume (PVR) respectively were performed for all patients.

Patients were divided into 2 groups according to the high level of PSA value. Group 1 included 49 patients with PSA level between 4-10 ng/mL. Group 2 included 47 patients with PSA level higher than 10 ng/mL. Patients were treated with Ciprofloxacin (500mg b.i.d.) orally for 2 weeks. tPSA and fPSA determinations were repeated 2 weeks after antibiotic treatment. All patients' PSA levels were evaluated and analyzed before and after antibiotic treatment. TRUS guided 12 cores prostate biopsy, using an 18-G needle fitted to an automatic biopsy gun, was performed to all patients. Cancer detection rates after prostate biopsy were also noted.

Statistical analyses were performed with SPSS version 18.0 and data were displayed as mean ± standard deviation (SD) (range). Independent sample t test and Chi-square test were used for statistical comparisons. A 5% level of significance was used for all statistical testing. A p value<0.05 was considered as significant.

3. Results

The mean age was 61.6 ±5.7 (51-75) years in group 1 and 63.1 ±8.7 (55-74) years in group 2. The mean age was similar between two groups (p= 0.76). There were no significant differences between the mean IPSS score (p=0.53), Qmax (0.65), Qave (p=0.57), QoL score (0.67), PVR (0.69) and prostate volume were measured with TRUS (0.87) in two groups. Suspicious DRE findings were significantly high in group 2. Demographic data of the patients are shown in table 1.

The mean tPSA values were 6.82±0.42 and 5.93±0.36 before and after antibiotic treatment in group 1 respectively. There was no significant difference tPSA value before and after antibiotic treatment in group 1(p=0.38). The mean fPSA and fPSA/tPSA ratio were similar before and after antibiotic treatment in group 1 and it was not statistically significant.

The mean tPSA values were 32.53±8.23 and 11.72±5.61 before and after antibiotic treatment in group 2 respectively. The mean tPSA value decreased significantly after antibiotic treatment in group 2 (p=0.01). The mean fPSA and fPSA/tPSA ratio were similar before and after antibiotic treatment in group 2 and it was not statistically significant. The mean tPSA, PSA and fPSA / tPSA ratio change are shown in table 2.

Table 1. Some demographic characteristics of the patients

	Group 1 (n=49) (PSA 4-10 ng/mL)	Group 2 (n=47) (PSA >10 ng/mL)	p value
Age(years)	61.6 ± 5.7 (51-75)	63.1 ± 8.7 (55-74)	0.76
IPSS score	16.1 ± 2.3 (11-25)	15.7 ± 2.1 (10-26)	0.53
Qmax (mL/s)	7.8 ± 3.5 (5-9)	7.6 ± 2.9 (6-12)	0.65
Qave (mL/s)	3.9 ± 0.4 (3-5)	4.1 ± 0.6 (3-6)	0.57
QoL score	4.2 ± 0.6 (3-5)	3.9 ± 0.5 (4-7)	0.67
PVR (mL)	83.7 ± 46.8 (50-130)	89.5 ± 57.3 (50-110)	0.69
TRUS Prostate volume (mL)	58.5 ± 13.7 (41-73)	59.8 ± 15.8 (45-82)	0.87
DRE: suspected, %, (n)	26.5 (13)	44.6 (21)	0.03

Table 2. The mean tPSA, PSA and fPSA / tPSA ratio change

	n (%)	PSA value before antibiotics	PSA value after antibiotics	p
Group 1 (PSA 4-10 ng/mL)	49 (51.04)			
tPSA,		6.82 ± 0.42	5.93 ± 0.36	0.38
fPSA		1.51 ± 0.08	1.45 ± 0.12	0.21
fPSA/tPSA		0.21 ± 0.04	0.23 ± 0.02	0.36
Group 2 (PSA >10 ng/mL)	47 (48.96)			
tPSA,		32.53 ± 8.23	11.72 ± 5.61	0.01
fPSA		4.76 ± 1.43	4.52 ± 1.68	0.47
fPSA/tPSA		0.17±0.05	0.16±0.03	0.51

TRUS guided 12 cores prostate biopsy, using an 18-G needle fitted to an automatic biopsy gun, was performed to all patients. Prostate cancer was detected in 32 patients after TRUS guided prostate biopsy. Prostate cancer was identified in 13 patients in group 1 and 19 patients in group 2.

4. Discussion

Serum PSA is mostly used for diagnosis of prostate cancer. PSA is an organ-specific marker but it is not specific to cancer and prostate inflammation increases serum PSA (6). Many studies on the subject showed that prostate biopsy is taken and often do not detect prostate cancer (4,6). Recent studies showed that the asymptomatic prostatic inflammation prevalence rate is high and antibiotherapy before prostate biopsy decreased tPSA levels to normal and in some of these patients unnecessary prostate biopsies could be prevented (7,8).

Bulbul et al. (8) gave ciprofloxacin for two weeks to patients with lower urinary system symptoms and high PSA. After two weeks PSA levels decreased in 52% of the cases and they reported that almost 50% of the patients prevented prostate biopsy. In another study on the subject Tan et al. (9) gave antibiotic treatment for two weeks to patients with high serum PSA levels who have normal findings for cancer at digital rectal examination. They reported that PSA levels decreased to normal in 19 of the patients after antibiotic treatment and emphasized that antibiotic treatment is useful. In a recent study Faydaci et al. (6) gave antibiotics to 108 patients older than 50 years of age with lower urinary system symptoms and tPSA>2.5 ng/mL for three weeks. After antibiotic treatment they took prostate biopsy from all patients. tPSA, fPSA and fPSA/tPSA ratio changes before and after antibiotherapy did not show any statistically significant difference ($p>0.05$). they emphasized that prostate biopsy should be considered without trying antibiotherapy in patients with high PSA values if a suspicion of prostatitis does not exist. In another study the authors concluded that medical treatment for a likely subclinical prostatitis resulted in a decrease of PSA, which was significant only in benign conditions in patients with increased PSA (10). In another recent study Toktas et al. (2) reported on 140 patients with a PSA level between 2.5 and 10 ng/mL and normal digital rectal examinations (DRE). They reported that antibiotic treatment given to the patients with a PSA level between 2.5 and 10 ng/mL can be beneficial, before a decision for TRUS guided prostate biopsy, just in a limited subgroup by reducing the PSA levels below the threshold value.

In our study, we investigated the effect of antibiotics in patients with PSA value higher than 4 ng/mL on tPSA, fPSA and fPSA/tPSA ratio without missing cancer and avoiding unnecessary biopsies. The mean tPSA values were 6.82±0.42 and 5.93±0.36 before and after antibiotic treatment in group 1 respectively and there was no significant differences tPSA value before and after antibiotic treatment in group 1($p=0.38$). The mean fPSA and fPSA / tPSA ratio were similar before and after antibiotic treatment in group 1 and it was not statistically significant. The mean tPSA values were 32.53±8.23 and 11.72±5.61 before and after antibiotic treatment in group 2 respectively. The mean tPSA value decreased significantly after antibiotic treatment in group 2 ($p=0.01$). The mean fPSA and fPSA / tPSA ratio were similar before and after antibiotic treatment in group 2 and it was not statistically significant.

In our study TRUS guided 12 cores prostate biopsy, using an 18-G needle fitted to an automatic biopsy gun, was performed to all patients. Prostate cancer was detected in 32 patients after TRUS guided prostate biopsy. Prostate cancer was identified in 13 (26.53%) patients in group 1 and 19 (40.42%) patients in group 2. In a study conducted in China prostate cancer detection rates found 40.7% for all patients at prostate biopsy. Prostate cancer detection rates was found as 6.9% for PSA between 4-10ng/mL (11). In other studies conducted on the subject of prostate biopsy cancer detection rate is between 25-35% (8,12,13). In the present study we investigated the effect of antibiotics in patients with PSA value higher than 4 ng/mL but it has some limitations. The main limitations of our study include its retrospective nature. In addition the outcomes presented here represent a single-centre experience. Multicenter, randomized, and controlled studies would better confirm our findings.

5. Conclusion

As a conclusion, antibiotic treatment in patients with PSA levels between 4-10 ng/mL is not effective on prostate biopsy decision in our study. But antibiotic treatment in patients with PSA levels higher than 10 ng/mL is effective on prostate biopsy decision and antibiotic treatment can prevent unnecessary prostate biopsies.

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