

Evaluation of prostate-specific antigen in patients with urinary tract infection

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Abstract:

Evaluation of prostate-specific antigen in patients with urinary tract infection. Blood samples were collected from patients with UTI and healthy control. Prostate Specific Antigen (PSA) in patients and healthy control were estimated using ELISA system. the study current included 50 patients suffering with UTI and 40 of the control group (healthy). Patients age groups ranged between 35-58 years and divided into four groups according to their age percentage 30% patients among 35-40 years, 22% patients among 41-46 years and 18 % patients among 47-53 years and 30% patients among 53-58 years. Mean concentration of the PSA level in patients serum with UTI was the high concentration in normal PSA levels (11.5 ± 4.4) and (14.3 ± 3.9) in high PSA levels of the age groups (53-58 years), In comparison with healthy groups (control). The results study of PSA level in serum with the age groups that their correlated between patients with UTI were significantly different ($P<0.01$). Significant relationships between total prostate specific antigen levels and male. The detection of genotypes for prostate-specific antigen in a patient. Furthermore, it needed to detection early diagnosis in cases of urinary tract infection in male and early treatment to avoid complication.

تقييم مستضد البروستات النوعي في المرضى مع التهاب المسالك البولية

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الكلمة المفتاحية: مستضد البروستات النوعي , التهاب المسالك البولية , ELISA .

الخلاصة

تقييم مستضد البروستات النوعي في المرضى مع التهاب المسالك البولية. جمعت العينات الدم من المرضى مع التهاب المسالك البولية و مقارنتها مع المجاميع الأصحاء (السيطرة). قيمت المستضد البروستات النوعي في مصل المرضى و مجاميع السيطرة بواسطة جهاز الاليزا . ضمت الدراسة خمسين مريض مصاب مع التهاب المسالك البولية و أربعين من مجموعة السيطرة (الأصحاء) . قسمت معدل الفئات العمرية للمرضى بين 35-58 سنة الى أربعة مجاميع وفقا نسب اعمارهم 30% من المرضى بين 35-40 سنة, 22% من المرضى بين 41-46 سنة و 18% بين المرضى 47-53 سنة و 30% من المرضى بين 53-58 سنة. متوسط التركيز للمستوى المستضد البروستات النوعية في مصل المرضى مع التهاب المسالك البولية كان تركيزه عالي في مستوى الطبيعي (11.5 ± 4.4) للمستضد النوعي و (14.3 ± 3.9) في المرضى للمستضد البروستات النوعي العالي عند الفئات العمرية 53-58 سنة. مقارنتها مع مجموعات السيطرة (الأصحاء). كانت نتائج الدراسة للمستوى المستضد البروستات النوعية في مصل مع مجاميع الفئات العمرية التي لها علاقة بين المرضى مع التهاب المسالك البولية فروقا معنويا ($P<0.01$). هناك علاقة مهمة بين مستويات المستضد البروستات النوعية الكلية مع الرجال. الكشف عن التنميط الجيني للمستضد البروستات النوعي في المرضى. وأيضا هناك الحاجة للتشخيص المبكر في الحالات مع التهاب المسالك البولية في الرجال والعلاج المبكر لتجنب المضاعفات.

1- INTRODUCTION

Urinary tract infection can be defined as the persistent presence within the urinary tract of actively multiplying microorganisms (1). Signs and symptoms of UTI and a positive bacterial culture have a high serum prostate-specific antigen (PSA) level (2). PSA is a glycoprotein that is mainly prostatic epithelial cells. The majority of PSA is generated in the Transitional Zone (TZ) of a prostate gland (3). The relationship between bacterial infection of urinary tract with prostate specific antigen in patient's serum and the most common bacteria of UTI leading to increase the level of prostate specific antigen in serum (4). The UTI is the most common disease of the urinary tract and it is a major cause of morbidity in both the hospital and the community (5). They are caused by bacteria that are normally present in digestive system and on the skin around the rectum. These bacteria can pass through the urethra and up into the bladder (6). *Escherichia coli* is the most common bacterial cause of UTI (7). The increase in serum PSA in patients with UTI, this occurred as a result of incidental or reflects an innate defense's mechanism of the prostate (8). The present study aimed to evaluate the PSA levels in the patient's serum suffered of UTI and the relation of total PSA level with age (9, 10).

2- PATIENTS AND METHODS

This study was a kind of case-control study. The study included 50 patients (male) complained from UTI with 40 healthy controls, that attending Al-Sader Medical City and Al-Hakeem General Hospital in Al-Najaf province for medical care and examined within period from May to June 2015. Their ages ranged between 35-58yr. The case-control study and the diagnosis was made by an urologist in above-mentioned hospitals, noted that these patients do not have any diseases in the prostate gland.

The blood was collected in a plain venipuncture tube without additives anti-coagulants. Left the blood to clot at room temperature and the serum was separated by centrifuge at 3000 rpm for 5 minutes. The total PSA were determined by using ELISA PSA kit (Monobind, USA) with ELISA system (Biotek, USA).

Statistical significance was done by using statistical package for social sciences (SPSS) version 19-computer software for the analysis. The p value less than the 0.05 level of significance were considered statistically significant (11).

3-RESULTS

The dissemination of UTI among patients is shown in figure (1). The highest frequency (30%) of UTI were detected among patients with age groups 35-40 and 53-58 years. Followed in patients with age group 41-46 years (22%). While the lowest frequency (18%) was seen in patients with age group 47-52 years.



Figure (1): The distribution of UTI among patients with age groups

Based on ELISA, the normal PSA level of the highest elevated mean concentration (11.5 ± 4.4) was detected among patients with age group 53-58 years., followed by patients with age group 41-46 years. (2.1 ± 0.8). While, the lowest elevated mean concentration (1.5 ± 0.7) was determined in patients with age group 47-52 years., also the lowest elevated mean concentration (1.5 ± 0.7) was seen in patients with age group 35-40 years. As compared with control age groups (healthy).

The high PSA level of the highest elevated mean concentration (14.3 ± 3.9) was detected among patients with age group 53-58yrs., followed in patients with age group 47-52 years. (11.5 ± 4.4). While, the lowest slightly elevated mean concentration (9.4 ± 4.6) was identified in patients with age group 41-46 years., also the lowest elevated mean concentration (4.4 ± 4.2) was seen in patients with age group 35-40 years. As compared with control groups (Table 2).

Table (1): The relationship between age groups and PSA levels in patients with UTI (n=35 in normal PSA), (n=15 in high PSA) and control group (n=40)

Age group (year)	Patient				Control			
	Normal PSA		High PSA		Normal PSA		High PSA	
	N. (%)	M \pm SD	N. (%)	M \pm SD	N. (%)	M \pm SD	N. (%)	M \pm SD
35-40	15(50)	1.5 ± 0.7	4(20)	4.4 ± 4.2	20(50)	1.5 ± 0.7	0(0)	0
41-46	8(20)	2.1 ± 0.8	7(60)	9.4 ± 4.6	6(10)	1.4 ± 0.6	0(0)	0
47-52	7(17.5)	1.5 ± 0.8	2(10)	11.5 ± 4.4	7(20)	1.11 ± 0.6	0(0)	0
53-58	5(12.5)	11.5 ± 4.4	2(10)	14.3 ± 3.9	7(20)	1.5 ± 0.8	0(0)	0
P value	<0.001				<0.05			

4- DISCUSSION

The bacterial UTI implies both microbial colonization of the urine and invasion of the lower or upper urinary tract by microorganisms. UTI is an infection that affects part of the urinary tract. It is an infection with more than 100,000 organisms per milliliters in the mid-stream urine samples (12). UTI is the second most common type of infection in the body, accounting for about 8.1 million visits to health care providers each year (13). Several studies found that UTI increase the level of PSA in patients (14, 15, and 16). PSA is normally present in the blood at very low levels; the upper limit of PSA normal is less than four ng/mL (3). In this study, we compared the levels of PSA in patients with UTI and healthy persons with different age groups.

The results found that older patients (53-58 years.) have high PSA levels (14.3 ± 3.9) than younger patients. Present study agrees with (3, 14, 17, 18) who found that the PSA levels increased directly with older patients with UTI.

Additionally, a significant correlation between PSA levels with UTI in comparison with control group ($p < 0.01$). UTI can cause an increase of PSA level, because of the close proximity of the urinary tract with the prostate, the infection can irritate and inflame prostate cells and cause PSA to go up as reported by 19. The increasing PSA in patients of UTI is reflects an innate defense mechanism of the prostate (20). Similar results were found in other studies (8, 10, 15).

In patients with UTI, the mean concentration of normal PSA level with ages group 53-58 years. were significantly higher than other age groups. These results agree with results of (6, 10) who found that the Age-specific PSA levels correlated directly with older ages compared with healthy (control) groups.

5- CONCLUSIONS

Increasing the PSA level in patients with symptoms of UTI, which indicates that UTIs in men affect the prostate gland which leading to increasing PSA in the serum of patients.

6- RECOMMENDATION

Examining the PSA levels in the patients with UTI before and after treatment. Genotyping for prostate-specific antigen in patients to determine the types elevated in UTI.

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