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RESEARCH ARTICLE

THE CHANGES IN THE SERUM LEVEL OF PROSTATIC SPECIFIC ANTIGEN IN FEMALES WITH ACUTE URINARY TRACT INFECTION IN DIFFERENT AGE GROUPS

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ABSTRACT

Prostate-specific antigen (PSA) is a valuable tumor marker for prostate cancer. It was believed that PSA was produced exclusively by the epithelial cells of the prostate gland, but a large body of evidence demonstrates that PSA is not a prostate-specific molecule (Giai M 1995). Prostate-specific antigen (PSA) is present at very low concentrations in female serum, but it can now be measured with highly sensitive immunoassays (Yu H, Diamandis EP 1995). PSA has been shown to be expressed in many forms of female tissues. The breast is a major female organ able to produce PSA (Borchert GH 1997). Pregnant women have elevated serum PSA (Yu H, Diamandis EP 1995). PSA levels in serum also vary during menstrual cycles and increase in women with excess androgen . In general a normal serum level of PSA is 0.02ng/dl- 0.06ng/dl (Mardanian F 2011). The objective of the study is to detect the changes of the serum level of PSA in women with acute UTI and show the difference of serum level pre and post- treatment at different age groups. One hundred patients aged from 16 to 77 years presented with features of acute cystitis and diagnosed as a UTI cases definitely by urine culture. Those patients were divided into 2 groups according to menopausal state. Group A pre-menopausal females 56 patients . Group B post-menopausal females 44 patients. The pretreatment mean level of PSA for group A 0.09nag/dl. while the mean level PSA for group B was 0.3nag/dl. The result shows that the post-treatment mean level for group A was 0.02nag/dl . while for group B was 0.09nag/dl. We concluded that the serum PSA level is elevated in females with acute UTI and decline post-treatment with highly detectable level in both pre and post-treatment with post-menopausal females.

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INTRODUCTION

Prostatic-specific antigen (PSA) is a 33-KDa serine protease with chymotrypsin-like enzymatic activity (Zaviacic, 2000). In males, PSA is produced by the prostate gland , and it is present in prostatic tissue, seminal plasma, and male serum . Small amounts of PSA also can be produced by the periurethral glands, and the PSA concentration in male serum is a valuable tumor marker for diagnosis and management of prostate cancer (Giai, 1995). PSA was believed to be completely absent from all female tissues and fluids. However, PSA has been detected recently in some female tissues (including breast, ovarian, and endometrial tissues) and body fluids (amniotic fluid, milk, and breast cyst fluid) (Kamenov, 2011, Zarghami, 1997).

PSA is present at very low concentrations in female serum, but it can now be measured with highly sensitive immunoassays (Yu and Diamandis, 1995, Ferguson, 1996). it found that in female tissues the PSA gene is regulated by steroid hormones through the action of steroid hormone receptors (Melegos, 1997). A large study examined the levels of PSA in female serum and confirmed that, among serum samples from 1064 women, the highest concentration observed was 0.9 nag. The median PSA in normal women is about 0.002 nag. Women with hyperandrogenic syndromes may have levels up to 0.6 nag (Melegos, 1997, Stamey,1996). On the other hand using conventional PSA assays with a detection limit of 0.1–0.01 nag/dl. Histomorphologic studies have provided evidence of PSA producing tissue in the female urethra (Stamey, 1996).

Some urine samples from women in a small series were positive for PSA, but no systematic investigation of this subject has been done to date. A urine PSA level was detected in 11% of all women studied, with PSA values apparently age dependent (Melegos, 1996). PSA in female serum generally increased in female with benign and malignant breast lesion and free serum PSA decreased after surgery treatment. PSA also increased in carcinomas of skenes urethral glands in female, pregnancy and lactating women (Diamandis, 2000, Kamenov, 2001).

MATERIALS AND METHODS

- Urine culture and sensitivity for documentations of UTI.
- Abdominal and breast ultrasonography to exclude gynecological problems and breast masses.
- One hundred patients divided into group A (pre-menopause) and group B (post-menopause).
- Serum samples for PAS pre and post-treatment by immunochemical assays methods.
- Means of serum PSA taken for each group A and B pre and post-treatment.

Patients and methods: This study is a prospective study type from April 2018 to August 2018 were one hundred females with acute UTI were investigated for their symptoms in private clinic in Baghdad. A thorough medical history of their present illness were taken and examination for each patient. Those 100 patients were divided into 2 group:-

Group A: Pre-menopausal females (56) with mean age (34.5) years.

Group B: Post-menopausal females (44) with mean age (58) years……

Ultrasound taken for all to evaluate genitourinary tracts and breast for hidden pathologies. GUE and urine for culture and sensitivity done for each patient. Serum sample for PSA send for each patient before antibiotic treatment. Antibiotic given initially traditionally for 3 days till the result of urine culture appeared. Additional 3 days of antibiotics by drugs of maximum sensitivity were given. Other serum sample for PSA send again 4 days later to same lab for re-evaluation …….....

RESULTS

In group A: 56 pre-menopausal females with mean age of (34.5) years, the pre-treatment mean level of serum PSA was (0.09 nag/dl) and post-treatment mean level of serum PSA was (0.03 nag/dl).

Table 1. Show the result of mean level of serum PSA in both group A & B according to menopausal state

Group	Patient NO.	Mean age (year).	Pre-treatment mean level of serum PSA nag/dl.	Post-treatment mean level of serum PSA nag/dl.
A	56	34.5	0.09	0.03
B	44	58	0.3	0.09

In group B: 44 post-menopausal females with mean age of (58) years, the pre-treatment mean level of serum PSA was (0.3 nag/dl) and post-treatment mean level of serum PSA was (0.09ng/dl/).

DISCUSSION

A level of PSA is rarely evaluated in females serum due to specificity of the test to male particularly and its strong relation to prostatic diseases in male. In our study 100 female patients with acute UTI were subjected to evaluation of their serum PSA pre and post-treatment to establish any relation of a detectable changes in the serum level following treatment, also to show the differences of the mean level of serum PSA in different age group in female. In group A mean age of this group was 34.5 years , and the mean pre-treatment level of serum PSA was (0.09nag/dl) ,while post-treatment mean level of serum PSA was (0.03 nag/dl). The least post-treatment serum level of PSA was (0.01ng/dl) which was reported for 8 patients females with age less than (20) years, while, The greatest post-treatment serum level of PSA was (0.7 nag/dl) for 12 females patient with age more than (35) years. In group B mean age of this group was 58 years, and the mean pre-treatment level of serum PSA was (0.3nag/dl), while post-treatment mean level of serum PSA was (0.09 nag/dl). The least post-treatment serum level of PSA was (0.02 nag/dl) which was reported for 11 patients females with age less than (49) years , while ,The greatest post-treatment serum level of PSA was(1.3 nag/dl) for 9 females patient with age more than (65) years. Six post-menopausal patients were suffer from recurrent cystitis show the greater increase level which exceeds 0.7 in all those patients in post treatment state…….

From above result , its clearly that serum PSA in females was affected by 3 factors:-

- Mean serum PSA level decreased significantly in both groups following treatment of acute UTI by antibiotics.
- Mean serum PSA level significantly increased with post-menopausal females both in pre and post-treatment conditions.
- Mean serum PSA level significantly increased in old females (more than 65 years) which suffered from recurrent cystitis than those who suffered from sporadic acute UTI with similar age group.

Many study try to establish a correlation between detectable serum PSA in female and other pathology which may be significantly valuable to be considered as tumor marker or as marker for other benign diseases but no of the study discussed the correlation of serum PSA with UTI in female according to different age group. Berkel H in 1997 show that PSA levels in nipple aspirate fluid may be indicative of breast cancer risk. women with PSA-positive breast cancer have better disease-free survival as well as overall survival than those with PSA-negative breast cancer. High concentrations of PSA are found in amniotic fluid and the levels change with gestational age. Pregnant women have elevated serum PSA. PSA levels in serum also vary during

menstrual cycles and increase in women with excess androgen. Fawzi C.Mashkoor Jasim N.Al-Asadi Lamia M.Al-Naama concluded that preoperative measurement of serum TPSA and FPSA in the diagnosis of women with breast cancer, may be a useful marker for monitoring the response to treatment. Melegos DN[1], Yu H, Ashok M, Wang C, Stanczyk F, Diamandis EP. Show that PSA levels were higher in hirsute women in comparison with controls. In hirsute women, levels of PSA and 3 alpha-androstanediol glucuronide (3 alpha-AG), a specific metabolite of androgen action, showed a significant positive correlation, whereas PSA and 3 alpha-AG showed a significant negative correlation with patient age. Receiver operating characteristic (ROC) analysis revealed that 3 alpha-AG was a slightly better marker of androgen excess than PSA. He conclude that female serum PSA may be a new biochemical marker of androgen action in females. Tamoghna Biswas, Adrija Datta, and Parijat Sen. Increased levels of serum PSA has been detected in women with breast cysts and fibroadenoma https://www.ncbi.nlm.nih.gov/pmc/articles/PM C3430053/ and is also thought to be a prognostic marker in women with metastatic breast cancer treated with megestrol acetate. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3430053/ However, the levels of PSA in malignant breast tissue have been found to be lower than in normal breast tissue or benign hyperplasia .https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3430053/ The value of PSA also increases in carcinoma of the female prostate (Skene's gland)……...

Conclusion

From above studies, we conclude that the serum level of PSA is significantly elevated in women with acute UTI than the usually low undetectable normal level. and the level is decreased after antibiotics therapy which can be considered as an indicator for elimination of infections ,furthermore women with recurrent cystitis have increased level of serum PSA more than those with sporadic acute UTI. Also the level is significantly correlated with age of female which may be indicator for non-diagnosed hidden pathology but till now no definite relation is clearly elaborated other than breast cancer, we hope in the near future PSA may become indicator for underling non-diagnosed pathologies or even a marker for chronic uro-gynecological problems.

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