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Association between Serum Sex Hormone Levels in Men with Lower Urinary Tract Symptoms

Authors
Nisha Luhadia[1], Mustafa Ali[2], Manish Kumar Gupta[3]
[1]Consultant Pathologist, Anand Hospital, Chindwara, MP, India
[2]Assistant Professor, Department of Pathology, Amaltas Institute of Medical Sciences, Dewas, MP, India
[3]Consultant Pathologist, Shalby Hospital, Jabalpur, MP, India
Corresponding Author
Dr Manish Kumar Gupta
Email: *gupta.drmanish@yahoo.in*

Abstract
Background: *The Lower Urinary Tract Symptoms (LUTS) complex consists of filling or irritative symptoms (Frequency, Urgency, Dysuria, Nocturia, and Odynouria) and voiding or obstructive symptoms (Poor stream, Hesitancy, Terminal dribbling, Incomplete voiding and Overflow incontinence. It affects 15–60% of men aged > 40 years. The prevalence rises markedly with age. Present study was designed to evaluate the association between serum sex hormones in men with LUTS.*
Objective: *Present study was designed to evaluate the association between serum sex hormones in men with LUTS.*
Material and Methods: *It was a study of one year duration involving 94 male patients and was carried out in KGMU, Lucknow in the Department of Pathology, presenting at Urology OPD, KGMU, Lucknow with complaints of Lower urinary tract symptoms.*
Results: *Age of patients ranged from 40 to 79 years. Serum free testosterone values ranged from 0.5 to 34.4 pg/ml. Serum total testosterone levels ranged from 0.70 to 12.68 ng/ml. Serum total estradiol levels ranged from 1.03 to 466.47 pg/ml. Serum dihydrotestosterone values ranged from 222.62 to 3467.29pg/ml.*
Conclusion: *Significant positive correlation was observed between serum levels of estradiol and LUTS.*
Keywords: *Lower Urinary Tract Symptoms, sex hormones, nocturia.*

Introduction

LUTS is associated with a diminished health related quality of life, depression and impairment in daily activities of life[1,2]. Benign prostatic hyperplasia (BPH) is the most common benign neoplasm in middle-age and older men that causes LUTS but we do not know more about other causes. Sex hormones that may have a role in causing LUTS are primarily testosterone and estradiol. Another hormone related to LUTS is PSA as it is secreted by prostate, that is main culprit for LUTS. Potential effects of sex hormones on the urinary tract that may contribute or cause LUTS has been observed in various studies. Within the bladder, LUTS are linked to RhoA/Rho-kinase (ROCK) pathway overactivity. Study done by Chavalmane PhD et al [3] speculated that a relative hyperestrogenism may induce bladder overactivity through the up-

regulation of RhoA/ROCK pathway. Androgen and estrogen receptors have been found to be present to a large extent in the epithelial cells of the urethra and the bladder [4].

Method and Material

Present study included patients who presented Urology OPD and had LUTS for more than 3 months identified by questionnaire method. Patients who had physical abnormality like stricture, stones, and tumor were excluded from the study. Venous blood sample was collected after proper informed consent and taking all aseptic precautions from patients in plain syringes and were allowed to clot. These clotted samples were then centrifuged for 10 minute at 2000 rpm. Supernatant serum was separated and stored at -20^0 C. For estimation of hormones (Free and Total Testosterone, Dihydrotestosterone and Estradiol and PSA) enzyme linked immune-sorbent assay (ELISA) method was used and standard protocol was used.
Questionnaire for LUTS included following:

a. Frequency
b. Urgency
c. Nocturia
d. Straining/hesitancy
e. Weak urinary stream
f. Intermittency
g. Feeling of incomplete bladder emptying

Calculation of Results

1. Calculation of the average absorbance values for each set of standards, controls and patient samples was done.
2. A standard curve was created by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit.
3. The concentration of the samples was also read directly from this standard curve.

Statistical analysis

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

Results

Age of patients ranged from 40 to 79 years with a mean age of 61.57±8.30 years. Maximum number of patients were aged 61-70 years (37.2%) followed by those aged 51-60 years (36.2%). A total of 11 (11.7%) patients were below 50 years of age while 14 (14.9%) were aged >70 years.
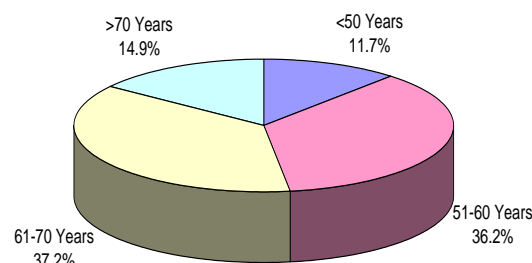
Fig.1: Age distribution of the patients

Serum PSA values ranged from 0.03 to 4.95 with a mean of 1.51±1.24 ng/ml.
Serum free testosterone values ranged from 0.5 to 34.4 with a mean value of 4.11±4.05 pg/ml.
Serum total testosterone levels ranged from 0.70 to 12.68 with a mean value of 4.32±2.42 ng/ml.
Serum total estradiol levels ranged from 1.03 to 466.47 pg/ml with a mean value of 50.05±58.75 pg/ml.
Serum dihydrotestosterone values ranged from 222.62 to 3467.29 with a mean value of 777.97±530.75 pg/ml.

Table: 1 Distribution of the serum sex hormonal & PSA levels

	Mean±sd (Min-Max) (n=94)	Expected Normal values
S. PSA (ng/ml)	1.51±1.24 (0.03-4.95)	<4
S. Free testosterone (pg/ml)	4.11±4.05 (0.5-34.4)	3.84-34.17
S. Total testosterone (ng/ml)	4.35±2.42 (0.70-12.68)	2-6.9
S. Estradiol (pg/ml)	50.05±58.76 (1.03-466.47)	10-36
S. Dihydro testosterone (pg/ml)	777.97±530.75 (222.62-3467.29)	250-990
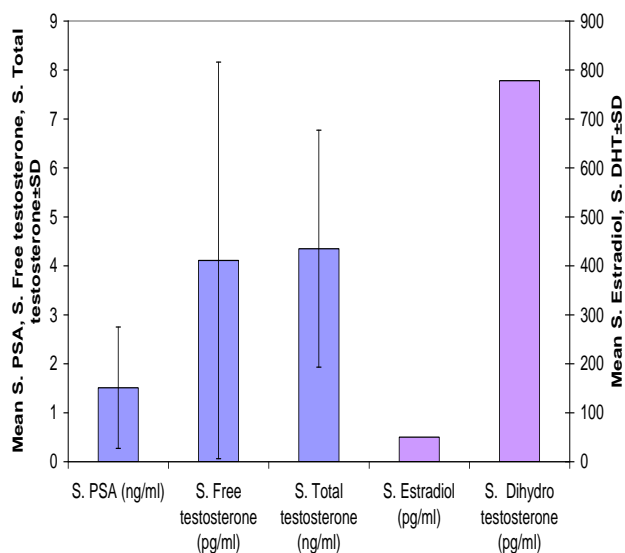
Fig. 2 Distribution of the serum sex hormonal & PSA levels

Discussion

LUTS is a fairly common problem in elderly men. Many studies have evaluated association of serum sex hormonal levels with LUTS but majority have failed to demonstrate any correlation between them. Fewer studies have shown positive correlation of estradiol and LUTS and prostate volume. Similary we also found increased estradiol level in significant numbers of patients [5, 6, 7, 8].

Conclusion

In our study, among all the sex hormones measured, serum estradiol (50.05±58.76 pg/ml) was the only hormone whose mean was above the expected normal reference range (10-36pg/ml).

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Conflicts of Interest: None
Competing Interest: None

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