Associations Between PSA Levels and Erectile Dysfunction in the Patient with LUTS

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Abstract

Erectile dysfunction (ED) are common problem in males with lower urinary tract symptoms (LUTS).The aim of this study is to evaluate whether there is an association between PSA levels and ED or not. This study included total of 54 males aged 45-75 years old, who attended in department of urology. International Prostate Symptom Score (IPSS) was used for LUTS measurements. The International Index of Erectile Function questionnaire-5 (IIEF) was used ED measurements. We evaluate the relationship between PSA and ED or LUTS.Patients were divided into3 groups according to PSA level. Group 1: 0,1-1,3 ng/dl, group 2: 1,3-3,2ng/dl and group 3: 3,2-10 ng/dl. The IPSS score was 16,9 in group 1, 18,1 in group 2 and 21 in group 3. The IIEF score 16,4/14,1/13,8 respectively. The severity of ED or LUTS was associated with the PSA level. PSA showed a significant positive correlation with ED and LUTS. In group 1 patients having lowest PSA level, sexuel function was better. ED was positively correlated with LUTS.ED and LUTS were significantly and independently correlated with PSA level. PSA may be a predictor factor for ED. But, there was no significant difference between PSA level and ED. Nevertheless, multicenteric, controlled, long-term, randomized studies are needed.

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Introduction

An erection is the result of parasympathetic signaling in response to activation of reflexogenic and psychogenic signals that ultimately lead to engorgement of the penis. The erectile pathway starts with acetycholine efflux from nerve terminals in the penis causing nitric oxide (NO) release from arterial endothelial cells leading to vasodilation and increased blood flow. This increased volume of blood within the vascular bed of the corpus cavernosum leads to compression of penile venules, resulting in veno-occlusion and tumescence. Detumescence is subsequently achieved via cyclic guanosine monophosphate (GMP) degradation and activation of the PDE5 enzyme, resulting in smooth muscle contraction [1].

Erectile dysfunction (ED) is the main complaint in male sexual medicine. Erectile dysfunction is defined as the persistent inability to attain and maintain an erection sufficient to permit satisfactory sexual performance. Epidemiological data have shown a high prevalence and incidence of ED worldwide. Erectile dysfunction (impotence) affects approximately 10 million to 20 million menin the United States [2]. It becomes more frequent with age but is not an inevitable consequence of normal aging [3,4].It is usually due to organic factors or diseases, such as pelvic vascular disease, diabetes mellitus, neurodegenerative disorders, side effects of medication, pelvic surgery, and trauma [4].

Lower urinary tract dysfunction (LUTD) and sexual dysfunction (SD) are common in urological practise. Data from epidemiological studies have demonstrated consistent and compelling evidence for an association between lower urinary tract symptoms (LUTS)/benign prostatic hypertrophy (BPH) and sexual dysfunction in aging men that is independent of the effects of age, other comorbidities, and various lifestyle factors Lower urinary tract symptoms (LUTS), often secondary to BPH, and erectile dysfunction (ED) are highly prevalent in older men [5,6]. The prevalence of LUTS and ED in older men may be as high as 31% and 52% , respectively [5,7]. Both ED and LUTS are associated with decreased quality of life [8,9].

Materials and Methods

This study included total of 54 males aged 45-75 years old, who attended in department of urology, Inonu University Turgut Ozal Medical Center. A detailed medical and sexual history

was obtained and a physical examination was performed in all patients. Physical examination included the assessment of genitourinary, endocrine, vascular, and neurologic systems.

International Prostate Symptom Score (IPSS) was used for LUTS measurements. LUTS was assessed in 1992, 1994, and 1998. Surgery history, including transurethral resection of the prostate (TURP), was collected on all questionnaires. Use of medications to treat BPH was collected in 1998. Men were asked to indicate frequency (0,10, 25, 50, 75, or almost 100% of the time) of the following: 1) sensation of incomplete bladder emptying (incomplete emptying), 2) having to urinate again after less than 2 hours (frequency), 3) stopping and starting several times during urination (intermittency), 4) difficulty postponing urination (urgency), 5) weak urinary stream (weak stream), and 6) having to push or strain to begin urination (hesitancy) [10]. Scores ranging from 0 to 5 were assigned, with a score of 0 corresponding to "0% of the time" and a score of 5 corresponding to "almost 100% of the time". Men were also asked how many times they typically had to get up at night to urinate (0, 1, 2, 3, 4, 5, or 6 or more times) during the past month (nocturia). A score ranging from 0 to 5 was assigned with "5 times" or "6 or more times" corresponding to a score of 5. These scores were summed to create a score ranging from 0 to 35, which we categorized into 4 groups: no or low (0–7), low-moderate (8–14), high-moderate (15–19), and severe (20–35) symptoms. Patients who had prostate cancer or prostate biopsies performed with in the last 6 months or prostate surgery were excluded.

The International Index of Erectile Function questionnaire-5 (IIEF) was used ED measurements, this test consisting of five questions, has evolved to be the standard for determining the severity of erectile dysfunction. The IIEF-5 consists of 5 questions relating to a person's sexual performance and focuses on erectile function and intercourse satisfaction. The maximum score is 25. Using acutoff score of 21, the sensitivity and specificity of discriminating between ED and no-ED are 0.98 and 0.88, respectively[11]. The respondents were further categorized intomild (IIEF-5 score: 17-21), moderate (IIEF-5: 8-16) and severe ED (IIEF-5: < 7). The IIEF-5 has been validated both internationally and locally for the assessment of male erectile function [12]. Men were excluded from the study if they had a history diabetes mellitus. The men were required to discontinue any other treatment forerectile dysfunction at least 30 days before entering the study.

All the men were found to have erectile dysfunction with a primarily organic cause on the basis of medical history, physical examination, laboratory evaluation, penile duplex ultrasonography (not all tests were conducted in each man).

Statistical Analyses

In the statistical assessment of the results 14.0 version of the SPSS (Statistical Package for Social Sciences) program, functioning in personal computers was used. In searching the correlation Pearson correlation analysis, while testing the significance of different series Fischer's exact test (with two ways) and when comparing the groups 'one way' ANOVA test were applied. The results were accepted as statistically significant when they were $p < 0,05$.

Results

Patientswere divided into3 groups according to PSA level. (Table 1) Group 1: 0,1-1,3 ng/dl, group 2: 1,3-3,2ng/dl and group 3: 3,2-10 ng/dl. The mean age of patients in the PSA groups were 61, 62,1 and 63 respectively. The number of patients in the PSA groups were 21, 17 and 16 respectively. The IPSS score was 16,9 in group 1, 18,1 in group 2 and 21 in group 3. The IIEF score 16,4/14,1/13,8 respectively (Table 1).PSA levelsinpatients with low(Group 1), revealedEDandLUTSlower. Namely in group 1 patients having lowest PSA levels, sexuel function was better. But, as a result of the statistical assessment between the groups, it was determined that there wasn't a correlation of PSA levels with IPSS score $(p > 0,05)$ and no significant relation was determined between PSA levels and IIEF score statistically.ED was positively correlated with LUTS. No statistical connection was established between ED and LUTS $(p > 0.05)$.

Table 1: Characteristic of groups according to PSA level

	PSA (ng/dl)	Patient Number	Mean Age	IPSS	IIEF
Group 1	0,1-1,3	21	61	16,9	16,4
Group 2	1,3-3,2	17	62,1	18,1	14,1
Group 3	3,2-10	16	63	21	13,8

Discussion

Prostate-specific antigen (PSA) is currently the most widely used prostatic tissue marker.PSA, also known as human kallikrein3 (hK3), has an enzymatic activity (serine protease). It is producedin ductal epithelial cells of the prostate and its main biologicalfunction is semen liquefaction. The disappearance of basal cells, impaired of basement membrane integrity and normal luminal structure was destroyed by diseases of the prostate (prostate cancer, prostatitis and benign prostatic hyperplasia) or prostate manipulation (prostate massage, prostate biopsy).When the presence of these conditions, PSA ismuch higher proportion into the blood [13].

Serum PSA level is varies according to age, gender and the prostate volume [14].PSA level shows an increase of 0,04 ng/ml per year in men without benign prostatic hyperplasia [15].However change rate of PSA level is 0,07 to 0,27 ng/ml per year in men between the ages of 60-85 with BPH [16]. Each of the increase 1 ml in prostate volume are known to enhance of PSA 4% [17].

In elderly men, BPH is a major risk factor for sexual dysfunctions. The prevalence of BPH increases with age, LUTS in men older than 50 years are probably due to BPH; LUTS in men younger than 40 years are usually due to other causes [18].Results from this study provide support for a positive association between LUTS and ED. Sexual activity is common in a majority of men over age 50 and is an important component of overall quality of life. Lower urinary tract symptoms (LUTS), which are often caused by benign prostatic hypertrophy (BPH), and sexual dysfunction are common in older men, with an overall prevalence of>50% in men aged > or =50 years.

The Massachusetts Male Aging (MSAM-7) study systematically investigated the relationship between LUTS and sexual dysfunction in > 12,000 men aged 50-80 years. It was performed in the US and six European countries (France, Germany, Italy, Netherlands, Spain, and UK). Eighty-three percent of men considered themselves sexually active, and 71% reported at least one episode of sexual activity in the past4 weeks. The overall prevalence of LUTS was 90%. Only 19% of men had sought medical help for LUTS and only 11% were medically treated. The overall prevalence of ED was 49%, and 10% of patients reported complete absence of

erection. The overall prevalence of ejaculation disorders was 46% and 5% reported anejaculation [5].

Conclusion

Results from this study also showed the severity of ED and LUTS may associate with the PSA level. PSA showed a significant positive correlation with ED and LUTS. In group 1 patients having lowest PSA level, sexuel function was better. ED may be positively correlated with LUTS but,were not statisticallysignificant.Randomized clinical trials with prospective repeated data collections are required to clarify the causal relationship between LUTS, ED, and PSA.

Conflict of Interest

The authors declare that they have no conflict of interest.

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