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RESEARCH ARTICLE

Evaluation of the Relationship Between Lower Urinary Tract Symptoms Secondary to Benign Prostatic Hyperplasia, Depression and Quality of Life

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ABSTRACT

Objective: This study aimed to evaluate the relationship between lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH), depression, and quality of life (QoL).

Materials and Methods: This cross-sectional study included 312 male patients over the age of 40 who were newly diagnosed with LUTS secondary to BPH between September 2019 and October 2023. LUTS, QoL, and depressive symptoms were assessed with the International Prostate Symptom Score (IPSS), short-form health survey (SF-36), and Beck Depression Inventory (BDI) questionnaires, respectively.

Results: Depression was detected in 46 (15%) patients. While IPSS total score, storage and voiding subscores were found to be significantly higher in cases with depression than in those without depression, SF-36 QoL scores were significantly lower. Depressive symptoms were more severe in patients with moderate to severe LUTS (9.2±7.3 vs 6.7±6.3, p=0.011). IPSS total, voiding and storage subscores were positively correlated with BDI scores and mostly negatively correlated with QoL scores.

Conclusion: This study showed that subjects with moderate to severe LUTS due to BPH had more severe depressive symptoms and a lower QoL than those who were mildly symptomatic. Increasing the severity of LUTS worsens depressive symptoms. Also, depression is associated with more severe LUTS.

Keywords: Benign prostatic hyperplasia, depression, lower urinary tract symptoms, quality of life

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INTRODUCTION

Lower urinary tract symptoms (LUTS) in middle-aged and elderly men mostly develop secondary to benign prostatic hyperplasia (BPH).[1] Its prevalence increases with age and varies between 50% and 80%.[2] The severity of LUTS can vary widely among affected men. Although LUTS is not usually a life threatening situation, it can negatively impact quality of life (QoL).[3]

Depression is an important mental illness that can impair patients' functionality, productivity and QoL, and its lifetime prevalence has been reported as 16.5%.[3,4] Various studies have shown that depressive symptoms are more common in individuals with comorbidities such as chronic obstructive pulmonary, cardiovascular and congestive heart diseases.[5–7]

In cross-sectional studies conducted in various countries, a significant relationship was found between LUTS and depressive symptoms.[8,9] Men with LUTS have been found to be more prone to depressive symptoms or suicidal thoughts.[10] A better understanding of the link between LUTS and depressive symptoms

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may enable early diagnosis and treatment of clinically relevant depressive symptoms and prevent suicide-related deaths. Therefore, in the present study, we aimed to investigate the association between LUTS secondary to BPH, depression and QoL.

MATERIALS and METHODS

Study Population

This cross-sectional study included men over 40 years of age who were newly diagnosed with LUTS secondary to BPH at a tertiary center between October 2019 and September 2023. Demographic data, medical history, comorbidities, smoking and alcohol consumption status of all patients were recorded. For total testosterone assessment, peripheral blood samples were collected from all cases between 8 a.m. and 11 a.m. following a 10–12-hour overnight fast. Total testosterone data were available for a total of 111 patients, 21 with depression and 90 without depression.

Patients who received medical treatment for LUTS (alpha-blockers, anticholinergics, 5-alpha-reductase inhibitors, and beta-3 agonist) or depressive disorders (antidepressants), and patients with urethral stenosis, neurogenic bladder, a history of prostate and/or bladder surgery, prostate cancer diagnosis, neurological disorders or cognitive dysfunction were excluded from the study.

The study was conducted according to the principles of the World Medical Association Declaration of Helsinki 'Ethical Principles for Medical Research Involving Human Subjects'. The study protocol was reviewed and approved by the institutional review board of Kanuni Sultan Süleyman Training and Research Hospital (number: KAEK/2023-10.154, 26.10.2023).

Evaluation of LUTS, Erectile Function, Depressive Symptoms, and QoL

LUTS severity, erectile function, depressive symptoms, and QoL were assessed using the International Prostate Symptom Score (IPSS), Index of Erectile Function-5 (IIEF-5), Beck Depression Inventory (BDI), and the short-form health survey (SF-36) questionnaires, respectively.

The severity of LUTS was stratified as mild (0–7 points), moderate (8–19 points), and severe (20–35 points) according to the IPSS scale.[11] In addition to the total IPSS score, voiding (sum of the scores for the feeling of incomplete emptying, hesitancy, intermittency, and weak stream) and storage (sum of the scores for frequency, urgency, and nocturia) symptom subscores were calculated.

BDI is a 21-item questionnaire that evaluates the somatic symptoms, cognitive, neurovegetative, affective, and endogenous aspects of depression.[12] According to BDI, depression scores were divided into four groups as minimal (0–9), mild (10–16), moderate (17–29) and severe (30–63). Patients with a BDI score of 17 or higher were considered to be in a state of depression.[13]

The SF-36 assesses QoL in the domains of physical functioning, physical role functioning, social role functioning, emotional role functioning, bodily pain, vitality, mental health, and general health perceptions[9] Higher scores are associated with better QoL.

Statistical Analysis

Statistical analysis was performed using SPSS Statistics v21.0 (IBM Corp., Armonk, NY, USA) software. The normality of the distribution of parameters was evaluated with the Kolmogorov-Smirnov test. The Mann-Whitney U test and Student's t-test were used for the comparison of the parameters. Categorical variables were compared using the chi-square test. Pearson's correlation test was used to investigate the correlation between variables. A level of $p<0.05$ was accepted as statistically significant.

RESULTS

The study population consisted of a total of 312 patients, and depression was detected in 46 (15%) patients. The mean ages of patients with and without depression were 61.2±5.9 and 59.8±6.6, respectively (p=0.18). BMI, presence of comorbidities (such as coronary artery disease, hypertension, and diabetes), smoking and alcohol consumption were comparable between patients with and without depression. Total testosterone levels of patients with and without depression were 324.1±97.3 and 320.6±93.1 ng/dl, respectively (p=0.88). The characteristics of the study cohort are given in Table 1.

The comparison of LUTS, QoL, and IIEF-5 scores of patients with and without depression is presented in Table 2. IPSS total score and storage, voiding and QoL subscores were significantly higher in patients with depression. All SF-36 subdomain scores in patients with depression were significantly lower than in those without depression. IIEF-5 scores were found to be similar between patients with depression and those without depression (16.2±1.4 vs 18.1±0.5, p=0.11).

The association of LUTS severity with QoL and depressive symptoms is presented in Table 3. Patients with moderate to severe LUTS had significantly lower general health perceptions, mental health, bodily pain, and vitality SF-36 subdomain scores than those with mild symptoms. However, physical functioning, emotional role functioning, social role functioning, and physical role functioning scores were similar between groups.

Table 1. Baseline characteristics of the study group

Characteristics	Depression cases (n=46)		Non-depression cases (n=266)		p
	n	%	n	%	
Age	61.2±5.9		59.8±6.6		0.18
BMI (kg/m²)	27.3±3.2		27.9±4.5		0.41
Alcohol consumption	7	15	29	11	0.38
Smoking					0.63
Current	10	22	56	21	
Never	24	52	124	47	
Ex-smoker	12	26	86	32	
Comorbidities					
HT	15	33	90	34	0.98
DM	13	28	52	19	0.23
CAD	4	9	25	9	1.00
Total testosterone (ng/dl)*	324.1±97.3		320.6±93.1	0.88	

Data is given as mean±SD unless otherwise stated. *: Total testosterone data were available for a total of 111 patients, 21 with depression and 90 without depression. BMI: Body mass index; HT: Hypertension; DM: Diabetes; CAD: Coronary artery disease; SD: Standard deviation

Table 2. Comparison of lower urinary tract symptoms and quality of life in patients with and without depression

Variables	Depression cases (n=46)	Non-depression cases (n=266)	p
IPSS			
Total score	18.4±8.1	14.2±8.2	0.002
Storage subscore	7.8±4.1	6.2±3.6	0.009
Voiding subscore	10.4±5.4	8.1±5.4	0.008
Quality of life score	3.7±1.5	2.9±1.5	0.001
SF-36 parameters			
Physical functioning	69.1±21.5	80.5±19.9	0.001
Physical role functioning	36.8±35.2	78.2±31.6	<0.001
General health perceptions	43.8±20.1	66.1±18.3	<0.001
Vitality	44.6±19.5	62.1±18.2	<0.001
Social role functioning	69.4±24.6	84.7±19.4	0.001
Emotional role functioning	35.2±35.5	76.9±35.9	<0.001
Mental health	50.5±17.9	67.8±17.9	<0.001
Bodily pain	12.7±4.1	16.1±3.7	<0.001
BDI score	21.6±5.5	6.3±4.4	<0.001
IIEF score	16.2±1.4	18.1±0.5	0.11

Data is given as mean±SD unless otherwise stated. IPSS: International prostate symptom score; SF-36: Short form 36; BDI: Beck depression inventory; IIEF: Index of Erectile Function

However, there was no significant difference between the groups in terms of physical functioning, physical role functioning, social role functioning, and emotional role functioning scores. Depressive symptoms were more severe in cases with moderate to severe LUTS (9.2±7.3 vs 6.7±6.3, p=0.011).

Table 3. Comparison of quality of life and depressive symptoms in patients with mild and moderate to severe lower urinary tract symptoms

Variables	LUTS severity by IPSS		p
	Mild (0–7) (n=78)	Moderate to severe (8–35) (n=234)	
SF-36 parameters			
Physical functioning	81.3±19.4	77.4±21	0.17
Physical role functioning	78.4±33	70.1±35.8	0.79
General health perceptions	67.1±18.2	61.4±20.4	0.04
Vitality	64.7±17.8	57.3±19.4	0.006
Social role functioning	86.2±19.7	80.7±21.2	0.06
Emotional role functioning	73.9±38.9	69.4±39.2	0.41
Mental health	72±18	62.8±18.5	<0.001
Bodily pain	17.1±2.8	15.1±4.2	<0.001
BDI score	6.7±6.3	9.2±7.3	0.011
Depression by BDI, n (%)			0.02
Minimal (0–9)	56 (72)	137 (59)	
Mild (10–16)	15 (19)	57 (24)	
Moderate (17–29)	7 (9)	37 (16)	
Severe (30–63)	0	3 (1)	

Data is given as mean±SD unless otherwise stated. LUTS: lower urinary tract symptoms

There was a positive correlation between IPSS total, storage and voiding subscores and BDI scores. In addition, IPSS (total, storage, and voiding) scores were highly negatively correlated with QoL scores. Details are given in Table 4.

DISCUSSION

In this cross-sectional study investigating the association between LUTS secondary to BPH, depression and QoL, the results demonstrated that men with depression had more severe LUTS and a lower QoL compared to those without depression. Additionally, men with moderate or severe LUTS had more severe depressive symptoms and a lower QoL compared to men with mild symptoms. Moreover, a positive correlation was found between the severity of LUTS and depressive symptoms, while the severity of LUTS showed a negative correlation with QoL.

It has been reported that 5.7% of adults over the age of 60 in the general population experience depression.[14] This rate was found to be 15% in our study group consisting of patients with LUTS due to BPH of similar age and it was significantly higher. In studies conducted in South Korea, China, and Poland, the prevalence of depression in patients with BPH and/or LUTS was reported as 4.9%, 17.7%, and 22.4%, respectively.[15–17] Differences in the prevalence of depression between populations may be due to ethnic or cultural differences. Considering these data, screening for depressive symptoms in men presenting with LUTS may provide early detection of patients at risk.

Several studies have reported an association between depression and LUTS.[9,10,18] In these studies, consistent with our findings, it was reported that the risk of depressive symptoms and depression increased in the presence of more severe LUTS, and that patients with depression suffered from more severe LUTS than patients without depression. Results from the Taiwanese and Korean populations showed that patients diagnosed with BPH developed depression 1.87 and 2.87 times more frequently than controls, respectively.[15,19] In addition, on the other hand, in a longitudinal study, depressed patients were found to have a higher risk of developing LUTS/BPH than patients without depression at a 2-year follow-up (odds ratio=2.10, p<0.001).[20] In summary, there is strong evidence for a relationship between LUTS and clinically significant depressive symptoms, and this relationship seems to be bidirectional. However, because of the cross-sectional nature of the studies, the causality of the association in both directions has not been fully elucidated yet.

Table 4. Correlations between IPSS, BDI, and SF-36 scores

Variables	Total IPSS	Storage subscore	Voiding subscore
	r	r	r
BDI score	0.232**	0.166**	0.228**
SF-36 parameters			
Physical functioning	–0.198**	–0.183**	–0.173**
Physical role functioning	–0.194**	–0.148*	–0.183**
General health perceptions	–0.197**	–0.164**	–0.178**
Vitality	–0.220**	–0.163**	–0.217**
Social role functioning	–0.167**	–0.170**	–0.136*
Emotional role functioning	–0.129*	–0.074	–0.137*
Mental health	–0.232**	–0.193**	–0.216**
Bodily pain	–0.227**	–0.142*	–0.243**

*: Correlation is significant at the 0.05 level (2-tailed); **: Correlation is significant at the 0.01 level (2-tailed)

Several physiological and psychological mechanisms have been proposed that could explain the link between LUTS secondary to BPH and depression. First, inflammation may represent a common mechanism in the pathogenesis of LUTS and depression. Significant increases in inflammatory markers such as interleukin-6, tumor necrosis factor-α, and C-reactive protein were found in patients with depression.[21] Systemic inflammation may cause LUTS by inducing the proliferation of epithelial and stromal prostate cells and prostatic hyperplasia.[22] Second, excessive secretion of corticotropin-releasing hormone due to the dysregulation of the hypothalamic-pituitary-adrenal axis leads to persistent hypercortisolism and overactivation of the sympathetic nervous system. As a result, increased adrenergic tone can cause both depressive symptoms and LUTS.[23] Third, it has been suggested that deterioration of serotonin synthesis is associated with voiding dysfunction as well as the development of depression.[24] In addition, antidepressant treatment has been shown to not only improve depression but also reduce LUTS and improve QoL.[25] In the psychological aspect, LUTS can cause embarrassment, social anxiety, restriction of daily activities, and deterioration of physical condition.[9,26] In addition, sleep deprivation caused by nocturia may affect the mood of individuals.[27] Impairment of sleep quality is associated with excessive daytime sleepiness, decreased ability to perform tasks that require attention, and depression.[28]

Similar to the findings of previous studies, our results revealed that the presence of more severe LUTS significantly impairs QoL in various aspects.[3] When voiding and storage symptoms were evaluated separately, each symptom group had a comparable and significant effect on depressive symptoms and QoL. Contrary to our findings, Coyne et al.[9] found that depression was more associated with storage symptoms. In addition, Eckhardt et al.[29] reported that QoL worsened as the severity of residual urine volume and urinary frequency increased. On the other hand, Sagnier et al.[30] reported that the most disturbing symptoms among LUTS were urgency, nocturia, and urinary incontinence.

This study has several limitations. First, due to the cross-sectional design of the study, causality and predictors between LUTS and depression could not be evaluated. Second, the size of the study population is not sufficient to generalize the results to the whole population. Third, total testosterone data were not available for some patients. Fourth, the most common comorbidities in our study cohort were hypertension, diabetes, and coronary artery disease, respectively. Hypertension, cardiovascular diseases, and cerebrovascular diseases are associated with an increased risk of depression, but it remains unclear whether treatment with antihypertensive agents decreases or increases this risk.[31–33] Although no significant difference was found in our study between patients with and without depression in terms of comorbidities such as hypertension, cardiovascular diseases, and cerebrovascular diseases, unfortunately, the lack of detailed data about the medications used by the patients was considered a limitation. Finally, the fact that only the BDI psychometric test was used in the diagnosis of depression instead of the psychiatric diagnosis interview administered by the physician is among the limitations of our study.

CONCLUSION

This study showed that men with moderate to severe LUTS secondary to BPH had more severe depressive symptoms and a lower QoL than those who were mildly symptomatic. Increasing the severity of LUTS worsens depressive symptoms. Also, depression is associated with more severe LUTS. Therefore, patients who apply to the physician due to LUTS or depressive symptoms should be screened for the other disease and managed with a multidisciplinary approach when necessary.

Disclosures

Ethics Committee Approval: The study was approved by the Kanuni Sultan Süleyman Training and Research Hospital Ethics Committee (No: 2023-10.154, Date: 26/10/2023).

Informed Consent: Written informed consent was obtained from all patients.

Peer-review: Externally peer reviewed.

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