

Correlation Between Voiding and Erectile Function in Patients with Symptomatic Benign Prostatic Hyperplasia

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Background: The relationship between lower urinary tract symptoms and male sexual dysfunction remains controversial. In this study, we aimed to evaluate the relationship between voiding and erectile function (EF) using the American Urological Association Symptom Index (AUA-SI) and International Index of EF (IIEF-15) in patients with benign prostatic hyperplasia (BPH).

Methods: From March 2001 to January 2002, 50 men (aged 43–92 years) with symptomatic BPH were enrolled in the study. They completed the AUA-SI and IIEF-15 questionnaires. An additional question about subjective erectile dysfunction (ED) was also evaluated. AUA-SI scores were divided into 3 categories (irritative, obstructive, and total), and IIEF-15 scores were divided into 6 categories (EF, orgasmic function [OF], sexual desire [SD], intercourse satisfaction [IS], overall satisfaction [OS], and total).

Results: Irritative, obstructive and total AUA-SI scores were 7.8 ± 3.7 , 8.4 ± 5.6 and 16.3 ± 8.2 , respectively. Scores in the 6 categories of the IIEF-15 questionnaire were as follows: EF, 12.1 ± 10.1 ; OF, 3.7 ± 3.8 ; SD, 4.4 ± 2.0 ; IS, 4.5 ± 4.4 ; OS, 4.4 ± 2.6 ; and total, 29.4 ± 22.2 . No obvious correlation was noted between AUA-SI and IIEF-15 scores. Further, no statistical significance was noted, either between AUA-SI and IIEF-15 severity, or between AUA-SI and EF severity. Among 22 patients who self-reported the absence of ED, 17 (77%) had an EF-domain score less than 26. The mean age of patients with, versus those without, ED was significantly greater.

Conclusion: Voiding and EF, assessed by the AUA-SI and IIEF-15 questionnaires, respectively, are not correlated in patients with BPH. [*J Chin Med Assoc* 2005;68(4):178–182]

Key Words: aging, American Urological Association Symptom Index, benign prostatic hyperplasia, erectile dysfunction, International Index of Erectile Function

Introduction

Benign prostatic hyperplasia (BPH) and erectile dysfunction (ED) are 2 major disease entities in urology. Some men with BPH have voiding symptoms, i.e. lower urinary tract symptoms (LUTS). With aging, the prevalence of both LUTS and ED increases.^{1–3} Conceptually, there may be some correlation between voiding and penile erection, since both functions are innervated by similar spinal cord levels, i.e. by both

parasympathetic and sympathetic nerves. Although many previous studies revealed some relationship between LUTS and sexual dysfunction,^{4–6} recent reports showed that LUTS had no direct effect on sexual dysfunction. Both LUTS and sexual dysfunction are simply more common in the elderly.^{7,8} Because of previous contention, we conducted this study to explore the possible relationship between voiding and erectile function (EF), by means of questionnaires, in patients with BPH.

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Methods

Study population

From March 2001 to January 2002, 72 inpatients (mean age, 73 years; range, 43–93 years) with BPH who were admitted for transrectal ultrasound-guided biopsy of the prostate were enrolled in the study. Age, concurrent illnesses (diabetes mellitus, hypertension, hyperlipidemia and coronary artery disease), and BPH medication were recorded.

Study questionnaires

The 2 study questionnaires — the American Urological Association Symptom Index (AUA-SI) and International Index of EF (IIEF-15)^{9,10} — were self-administered by patients. In addition, patients were asked whether or not they had ED, which was defined as the inability to achieve and/or maintain an erection sufficient for satisfactory sexual performance.¹¹ AUA-SI scores were divided into 3 categories: irritative (3 questions); obstructive (4 questions); and total. IIEF-15 scores were divided into 6 categories: EF; orgasmic function [OF]; sexual desire [SD]; intercourse satisfaction [IS]; overall satisfaction [OS]; and total.

Statistical analysis

AUA-SI and IIEF-15 scores for the ED and non-ED groups were evaluated and compared using the Mann-Whitney U test; ages were compared using a 2-sided *t* test. The correlation between AUA-SI and IIEF-15 categories was assessed using Pearson's correlation test. Further, AUA-SI and IIEF-15 scores were categorized according to the severity of symptoms: the "severity" of AUA-SI scores⁹ was considered mild (scores 0–7), moderate (8–19), or severe (20–35); whereas that of IIEF-15 scores¹² was considered as no ED (EF-domain score 26–30), mild (22–25), mild to moderate (17–21), moderate (11–16), or severe (6–10).

Age was also assessed as a single variable, and data for age, AUA-SI score, and EF-domain score were expressed as mean \pm standard deviation. Statistical significance was evaluated by the Kruskal-Wallis test, and a *p* value of less than 0.05 was considered significant.

Results

Demographic data

Fifty of the 72 patients answered all items on the questionnaires. The other 22 patients gave partial answers or no answers at all and were excluded.

Thirty-one patients had concurrent illnesses (diabetes mellitus [*n* = 12]; hypertension [*n* = 20]; hyperlipidemia [*n* = 5]; and/or coronary artery disease [*n* = 9]), and 40 were taking medication for BPH (tamsulosin or doxazosin [*n* = 37]; finasteride [*n* = 3]).

Questionnaire findings

Of the 50 men who completed the questionnaires, 28 (56%) aged from 68–93 years (mean, 75.8 years) answered that they had ED. Among the 22 men aged 43–80 years (mean, 70.0 years) who denied having ED, 17 (77%) had an EF-domain score of less than 26; a score of 26 is considered the threshold level below which erection is normal.¹² Patients with versus those without concurrent illnesses were more likely to have ED (64.5% vs 26.3%), and the prevalence of ED was similar in patients taking versus those not taking BPH medication. According to chart recordings or interviews, no new-onset ED was attributed to BPH medication. Moreover, patients with ED were significantly older than those without ED (Table 1).

Scores for 3 categories of the AUA-SI questionnaire, and 6 categories of the IIEF-15 questionnaire, together with patient ages, are listed as mean values (\pm standard deviation) in Table 1. There was no significant difference in voiding symptoms between patients with and those without ED, whereas each of the 5 domain scores, and total scores, on the IIEF-15 questionnaire were significantly different between the ED and non-ED groups (Table 1).

Between-questionnaire differences

No significant correlations between AUA-SI and IIEF-15 scores were identified (Table 2). In addition, analyses according to disease severity (mild, moderate or severe), as determined by AUA-SI score, revealed no statistically significant differences regarding patient ages, or scores in each of the IIEF-15 categories (Table 3). Similarly, analyses according to disease severity, as determined by scores on the IIEF-15 EF domain, revealed no statistically significant differences regarding scores in each of the AUA-SI categories; however, significant differences in patient age were noted between the various subgroups categorized according to EF-domain disease severity (Table 4).

Discussion

BPH and ED are 2 of the major disease entities in urology, and both are common in elderly men. Physiologically, urination and EF are controlled by

Table 1. Comparison of ages and scores in 3 categories of the AUA-SI questionnaire and 6 categories of the IIEF-15 questionnaire in patients with benign prostatic hyperplasia who had erectile dysfunction (ED) or who did not have ED

	All patients (n = 50)	ED (n = 28)	Non-ED (n = 22)	p
AUA-SI				
Irritative	7.8 ± 3.7	8.5 ± 3.7	6.9 ± 3.7	0.195*
Obstructive	8.4 ± 5.6	8.5 ± 4.7	8.3 ± 6.8	0.702*
Total†	16.3 ± 8.2	17.2 ± 6.8	15.2 ± 9.8	0.428*
IIEF-15				
Erectile function	12.1 ± 10.1	7.6 ± 7.6	17.2 ± 10.3	0.033*
Orgasmic function	3.7 ± 3.8	2.4 ± 3.1	5.5 ± 4.0	0.000*
Sexual desire	4.4 ± 2.0	3.5 ± 1.9	5.6 ± 2.0	0.003*
Intercourse satisfaction	4.5 ± 4.4	3.0 ± 3.5	6.5 ± 4.7	0.009*
Overall satisfaction	4.4 ± 2.6	3.6 ± 2.0	5.5 ± 2.9	0.024*
Total‡	29.4 ± 22.2	20.2 ± 17.2	41.0 ± 21.6	0.001*
Age, yr	73.0 ± 12.2	75.8 ± 6.5	70.0 ± 10.3	0.033§

*p value vs non-ED group using Mann-Whitney U test; †total of irritative and obstructive scores; ‡total of scores on all 5 domains on the IIEF-15 questionnaire; §p value vs non-ED group using 2-sided t test. All data are expressed as mean ± standard deviation. AUA-SI = American Urological Association Symptom Index; IIEF-15 = International Index of Erectile Function-15.

Table 2. Correlations between scores in 3 categories of the AUA-SI questionnaire and 6 categories of the IIEF-15 questionnaire

	AUA-SI		
	Irritative	Obstructive	Total*
IIEF-15			
Erectile function	-0.214	-0.134	-0.202
Orgasmic function	-0.215	-0.199	-0.249
Sexual desire	-0.235	-0.121	-0.190
Intercourse satisfaction	-0.173	-0.162	-0.210
Overall satisfaction	-0.174	-0.119	-0.147
Total†	-0.193	-0.144	-0.195

*Total of irritative and obstructive scores; †total of scores on all 5 domains on the IIEF-15 questionnaire. All data are expressed as Pearson correlation coefficients. AUA-SI = American Urological Association Symptom Index; IIEF-15 = International Index of Erectile Function-15.

similar levels of spinal-cord innervation. BPH becomes clinically significant later in a man's life: by age 60 years, approximately 50% of men have histologic evidence of BPH, whereas all men have such evidence by age 80 years.¹³ Men with LUTS tend to be older (mean age > 60 years) than those who present with ED (mean age usually < 60 years).¹⁴⁻¹⁷

A potential correlation between LUTS and ED remains questionable. Earlier studies showed some correlation between LUTS and ED,⁴⁻⁶ and a recent trial reported an increased odds ratio for LUTS indicating an increased severity of ED.¹⁸ However, some studies showed that the correlation between BPH and ED is coincidental, simply because these 2 conditions are more common in elderly individuals.^{7,8,19-21} Sexual function may be more closely related to the effect that LUTS have on quality of life,

rather than to LUTS themselves.²² In addition, the effect of severe irritative symptoms, or the presence of BPH-related morbidity (e.g. bladder stones), increases the incidence of ED.³ Thus, unless complications develop, the correlation between BPH and ED is usually coincidental. In our study, scores for irritative urinary symptoms did not correlate with EF-domain scores in BPH patients, possibly because such symptoms were not severe, and there was no BPH-related morbidity. Although there was a trend towards decreasing IIEF-15 scores with increasing AUA-SI scores (Table 3), this was not statistically significant. Further, there was a tendency towards increasing irritative AUA-SI scores with decreasing EF-domain scores (Table 4). We propose that the relatively small number of patients enrolled in the study may have influenced the statistical results since it was difficult to

Table 3. Patient ages and scores in 6 categories of the IIEF-15 questionnaire in relation to disease severity determined using the AUA-SI questionnaire

Disease severity (AUA-SI score)	Age, yr	Erectile function	Orgasmic function	Sexual desire	Intercourse satisfaction	Overall satisfaction	Total*
Mild (0–7)	67.3 ± 14.2	14.3 ± 10.9	5.1 ± 4.5	4.9 ± 1.8	5.2 ± 4.7	5.7 ± 2.7	35.1 ± 23.1
Moderate (8–19)	74.1 ± 7.4	12.2 ± 10.5	3.9 ± 3.7	4.5 ± 2.3	4.8 ± 2.3	4.1 ± 2.6	29.8 ± 23.0
Severe (20–35)	75.1 ± 6.0	10.8 ± 9.5	2.9 ± 3.7	4.1 ± 2.3	3.8 ± 4.3	4.2 ± 2.5	25.9 ± 21.1
<i>p</i> [†]	0.459	0.519	0.388	0.548	0.610	0.287	0.549

*Total of scores on all 5 domains of the IIEF-15 questionnaire; [†]determined by the Kruskal-Wallis test. All data are expressed as mean ± standard deviation. AUA-SI = American Urological Association Symptom Index; IIEF-15 = International Index of Erectile Function-15.

Table 4. Patient ages and scores in 3 categories of the AUA-SI questionnaire in relation to disease severity determined using the erectile-function (EF) domain of the IIEF-15 questionnaire

EF domain (score) [no. of pts]	Age, yr	AUA-SI		
		Irritative	Obstructive	Total*
No ED (26–30) [5]	62.0 ± 11.3	5.0 ± 2.7	8.6 ± 7.5	13.6 ± 10.2
Mild ED (22–25) [9]	69.2 ± 11.2	7.0 ± 3.7	5.8 ± 6.0	12.8 ± 8.8
Mild to moderate ED (17–21) [4]	72.8 ± 2.9	8.3 ± 4.2	9.0 ± 6.1	17.3 ± 9.2
Moderate ED (11–16) [9]	73.9 ± 4.4	8.6 ± 3.8	10.0 ± 5.6	18.8 ± 8.2
Severe ED (6–10) [23]	77.0 ± 6.8	8.4 ± 3.8	8.7 ± 5.2	17.3 ± 7.6
<i>p</i> [†]	0.014	0.329	0.522	0.476

*Total of irritative and obstructive scores; [†]determined by the Kruskal-Wallis test. All data are expressed as mean ± standard deviation. AUA-SI = American Urological Association Symptom Index; ED = erectile dysfunction; IIEF-15 = International Index of Erectile Function-15; pts = patients.

perform additional, age-adjusted division of AUA-SI and EF-domain scores to indicate disease severity.

Most of our patients took α -adrenergic blockers for the treatment of symptomatic BPH, and there seemed to be no increased incidence of ED. This concurs with the literature, in which treatments for BPH (whether medications or surgery) had no meaningful impact on sexual function.^{3,19} In addition, angiotensin-converting enzyme inhibitors or histamine₂-blockers used in patients with hypertension or heart disease seemed to have no influence on the incidence of ED.²³

An interesting finding in this study was patients who subjectively stated that they had no ED but who, nonetheless, had low EF-domain scores. In our trial, ED was defined as the inability to achieve and/or maintain an erection sufficient for satisfactory sexual performance.¹¹ However, when a broader base of sexual activity is used to define ED, as in some reports, to include touch, caressing, masturbation, and the absence of sexual activity during the previous 4 weeks, the incidence of ED increases.^{7,24–26} In our study, 77% of patients with a subjectively reported absence of ED actually had an EF-domain score of less than 26 and should therefore have been classified as having ED.¹² Considering cultural differences, a cut-off score of 15 on the IIEF-15 questionnaire may be more appropriate

for categorizing ED in Taiwanese individuals.²⁷ Although the rate of ED decreased from 77% to 59% after adjustment according to criteria reported by Chang et al,²⁷ the rate was still high enough to reflect cultural differences and traditional thoughts about ED.

In conclusion, the present study suggests that, with use of the objective AUA-SI and IIEF-15 questionnaires, no correlation exists between voiding function and EF in patients with BPH. Both LUTS and ED may simply appear concomitantly in elderly men as a normal aspect of aging. However, a study with a larger number of patients is needed to clarify this issue.

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