

Impact of Nocturia on Abnormal Daytime Sleepiness in Men with Lower Urinary Tract Symptoms/Benign Prostate Hyperplasia

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= Abstract =

Purpose: Nocturia is one of the most bothersome lower urinary tract symptoms (LUTS). The aim of the present study is to determine whether severe-nocturia have impact on the abnormal daytime sleepiness in men with LUTS/benign prostate hyperplasia (BPH).

Materials and Methods: Severe-nocturia was classified as twice or more per night. A total of 85 men met the criteria and constituted the study cohort. The patients had a detailed clinical evaluation, including a complete history, physical examination, urine analysis, urine culture, a digital rectal examination, serum prostate-specific antigen (PSA) level, prostate volume by transrectal ultrasonography, uroflowmetry and postvoid residual urine volume. LUTS and symptom-specific quality of life (QoL) were assessed using the IPSS. Patients were asked to complete an Epworth Sleepiness Scale questionnaire for daytime sleepiness.

Results: 43 patients had less than one, 42 patients had more than two episodes of nocturia. There was no significant difference of age, total prostate volume, PSA levels between patients with mild-nocturia and severe-nocturia. There was no significant difference of maximum flow rate (Qmax), voided volume and postvoid residual urine volume (PVR) between patients with mild-nocturia and severe-nocturia. There was significant decrease of total International Prostate Symptom Score (IPSS) scores and QoL index in patients with severe-nocturia compared in patients with mild-nocturia. The number of patients with abnormal daytime sleepiness in mild-nocturia and severe-nocturia were 4.7% (2/43), 16.7% (7/42), respectively ($p < 0.05$). Regression coefficient between percent of nocturia and total score of daytime sleepiness was significant ($p < 0.05$) and regression coefficient (R) was 0.29.

Conclusions: Our results indicate that severe-nocturia had impact on the abnormal daytime sleepiness in patients with LUTS.

Key Words: Nocturia, Lower urinary tract symptoms, Sleep disorders

Introduction

Nocturia is one of the most bothersome lower urinary tract symptoms (LUTS).¹ It may result in daytime fatigue, a lower level of general well-being, and the risk of nightly falls.² However, it is not clear that nocturia has an impact on the abnormal daytime sleepiness in men with LUTS/benign prostate hyperplasia (BPH).

Treating nocturia is thought to improve quality of life (QoL), but recent studies have shown that nocturia treatment only lessens nighttime voiding frequency, without changing QoL.³ This study was performed to determine whether nocturia has an impact on abnormal daytime sleepiness in men with LUTS/BPH.

Materials and Methods

Between January and December 2010, men presenting consecutively with LUTS/BPH were recruited into this prospective study. The study inclusion criteria were: age more than 50 years, eight or more points on the International Prostate Symptom Score (IPSS), and a prostate volume larger than 20 ml. The exclusion criteria included the use of medications for the control of bladder symptoms, use of sedatives or tranquilizers for treating sleep disturbances, bladder tumors, bladder stones, urethral strictures, neurogenic bladder dysfunction, restricted mobility, and working primarily at night. Patients were also excluded from the analysis if they had a documented history or clinical symptoms of acute prostatitis, prostate cancer (serum prostate-specific antigen [PSA] levels over 20 ng/ml), or prostatic intraepithelial neoplasia on biopsy, a history of prostate surgery or radiotherapy, acute urinary retention or an indwelling catheter, or evidence of acute urinary infection (pyuria and bacteriuria) on urine analysis. Of the consecutive patients, 85 met the criteria, including 43 mild nocturia patients (less than one episode of nocturia) and 42 severe nocturia patients (more than two episodes of nocturia), and these constituted the study cohort. The patients had a detailed clinical evaluation, including a complete history,

physical examination, urine analysis, urine culture, digital rectal examination, and estimates of serum PSA level, prostate volume by transrectal ultrasonography, uroflowmetry, and postvoid residual urine volume (PVR). LUTS and symptom-specific QoL were assessed using the IPSS. Frequency of nocturia was assessed using question 7 of the IPSS. Patients were asked to complete an Epworth Sleepiness Scale (ESS) questionnaire. The ESS was used for a measurement of the subject's general level of daytime sleepiness. The ESS is a widely used questionnaire designed to evaluate a patient's level of habitual sleepiness during the day.⁴ The scale comprises eight items that address typical day-to-day situations. It is likely that sleepiness, or imagined sleepiness, in each situation will be reported. Each item can be rated from 0 to 3 points (0=would never doze, 3=high chance of dozing), with the final score ranging from 0 to 24. The proposed range for normal sleep propensity is 0~10.⁵

Data are expressed as mean±standard error and compared statistically using two-way ANOVA or Fisher's exact test. A 5% level of significance was established for all of the statistical testing in the study, and all of the statistical tests were two-sided. The Statistical Package for the Social Sciences (SPSS version 13.0; SPSS Inc., Chicago, IL, USA) was used for data analysis.

Results

1. Profiles

The enrolled subjects were divided into 2 groups according to the nocturia severity (mild nocturia: n=43, less than one episode of nocturia vs. severe nocturia: n=42, more than two episodes of nocturia). The mean ages of the mild nocturia and severe nocturia groups were 62.1±1.8 and 63.0±1.2 years, respectively ($p > 0.05$). The mean total prostate volumes of the mild nocturia and severe nocturia groups were 31.3±1.5 and 30.1±1.8 ml, respectively ($p > 0.05$). The mean PSA levels of the mild nocturia and severe nocturia groups were 1.2±0.2 and 1.6±0.4 ng/ml, respectively ($p > 0.05$) (Table 1).

Table 1. Profiles in patients with mild nocturia or severe nocturia

Variable	Mild-nocturia	Severe-nocturia	p-value
Number of patients	43	42	> 0.05
Age	62.1±1.8	63.0±1.2	> 0.05
Prostate volumes (ml)	31.3±1.5	30.1±1.8	> 0.05
PSA (ng/ml)	1.2±0.2	1.6±0.4	> 0.05
Uroflowmetry			
Qmax (ml/s)	11.9±1.1	10.8±1.0	> 0.05
Voided volume (ml)	203.2±29.4	196.3±20.8	> 0.05
PVR (ml)	10.9±5.8	22.8±11.0	> 0.05
IPSS			
Number of nocturia	0.58±0.10	3.24±0.16	< 0.05
Total	9.3±0.9	22.0±1.1	< 0.05
QoL index	2.4±0.2	4.4±0.2	< 0.05

Data are expressed as mean±standard error.

PSA: prostate specific antigen, Qmax: maximum flow rate, PVR: post-void residual volume, IPSS: International Prostate Symptom Score, QoL: quality of life.

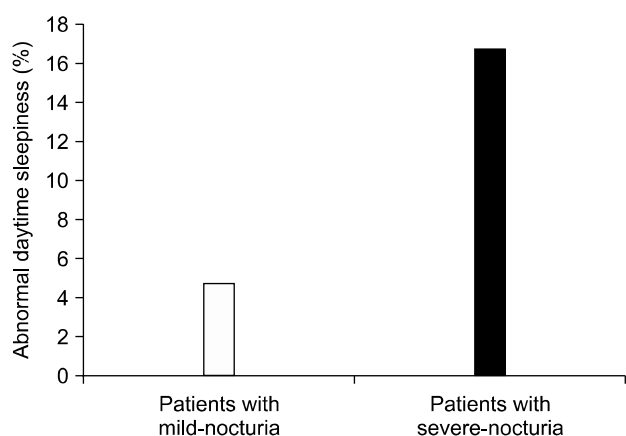


Fig. 1. Daytime sleepiness. The number of patients with abnormal daytime sleepiness in with mild nocturia and with severe nocturia were 4.7% and 19.0%, respectively (Fisher's exact test, $p < 0.05$).

2. Uroflowmetry

The mean maximum flow rate (Qmax) of the mild nocturia and severe nocturia groups were 11.9 ± 1.1 and 10.8 ± 1.0 , respectively ($p > 0.05$). The mean voided volume of the mild nocturia and severe nocturia groups were 203.2 ± 29.4 and 196.3 ± 20.8 , respectively ($p > 0.05$). The mean PVR of the mild nocturia and severe nocturia groups were 10.9 ± 5.8 and 22.8 ± 11.0 , respectively ($p > 0.05$) (Table 1).

3. International Prostate Symptom Score

The mean numbers of experiences of nocturia using question 7 of the IPSS of the mild nocturia and severe nocturia groups were 0.58 ± 0.10 and 3.24 ± 0.16 , respectively ($p < 0.01$). The mean total IPSS of the mild nocturia and severe nocturia groups were 9.3 ± 0.9 , 22.0 ± 1.1 , respectively ($p < 0.05$). The mean QoL index of the mild nocturia and severe nocturia groups were 2.4 ± 0.2 and 4.4 ± 0.2 , respectively ($p < 0.05$) (Table 1).

4. Daytime sleepiness

The mean daytime sleepiness of the mild nocturia and severe nocturia groups were 4.2 ± 0.7 and 6.9 ± 0.7 , respectively ($p < 0.01$). The number of patients with abnormal daytime sleepiness of the mild nocturia and severe nocturia groups were 4.7% (2 out of 43 patients) and 19.0% (8 out of 42 patients), respectively ($p < 0.05$) (Fig. 1). The regression coefficient between the number experiences of nocturia and the total score of daytime sleepiness was significant ($p < 0.05$), and the regression coefficient (R) was 0.29.

Discussion

Different general profiles of patients may have an impact on daytime sleepiness. In this study, there was no significant difference in age, total prostate volume,

or PSA levels between patients of the mild nocturia and severe nocturia groups. Our results indicate that severity of nocturia does not have a significant impact factor on the general profiles of patients.

Uroflowmetry is one of the objective parameters for diagnosing voiding difficulty in patients with LUTS/BPH. In this study, there was no significant difference in Qmax, voided volume, or PVR between patients of the mild nocturia and severe nocturia groups. Our results indicate that severity of nocturia does not have a significant enough impact factor to have an impact on the objective parameters.

IPSS is the most commonly used parameter for diagnosing nocturia in men with LUTS. In this study, there was a significant decrease in the total IPSS and QoL index of the severe nocturia group compared with the mild nocturia group. In general, QoL and total IPSS were significantly correlated with the presence of nocturia. Our results indicate that severity of nocturia was a significant impact factor on the subjective parameters. These results support the hypothesis that some nocturia patients with low QoL may be affected more by masked or ignored sleep problems. However, it is not clear that why the scores are different between the severe nocturia patients and mild nocturia patients.

The ESS was used because it is a widely accepted, self-administered questionnaire that has been shown to provide a measurement of the subject's general level of daytime sleepiness. Johns⁶ proposed that 'somnificity' underlies subjective sleep propensity, as distinct from subjective sleepiness,⁷ in each situation addressed by ESS items. The ESS has good reported internal consistency^{6,8} and reliability^{6,8,9} and has been compared to external criteria including the Multiple sleep Latency Test (MSLT) and Maintenance of Wakefulness Test,¹⁰⁻¹² Respiratory Disturbance Index,¹³ and Arousal Index.¹⁴ In general, the relationships between these measures and the ESS are moderate at best, and Chervin^{15,16} raises critical measurement validity issues associated with these indices of sleepiness. In this study, there was a significant increase in ESS scores in men with severe nocturia compared to men with mild nocturia. The number of experiences of abnormal daytime sleepiness increased significantly in men with severe

nocturia compared in patients with mild nocturia. Our results indicate that severe nocturia had a significant impact on abnormal daytime sleepiness in men with LUTS/BPH.

This study supports concept that nocturia and sleep disorder closely affect each other, and severe nocturia was found to have an impact on abnormal daytime sleepiness. This poor sleep is associated with deterioration in planning, concentration, and higher intellectual skills. Constant poor sleep can cause excessive daytime sleepiness.¹⁷ If their LUTS/BPH is not controlled, daytime sleepiness leads to poor nighttime sleep quality, and daily activities become more risky, especially in the elderly population. However, we have to note that there are some patients who wake to void at night (nocturia), which is 'true nocturia', but also those who unnecessarily voided as a consequence of having been awakened, which is known as 'pseudo nocturia'. However, without careful inspection, it is not easy to treat nocturia with sleep disorder.

The limit of this study was that the number of patients without nocturia in LUTS/BPH was too small, so we divided those with nocturia into two groups by severity (mild nocturia vs. severe nocturia). Also, the severity of nocturia was not defined by frequency of nocturia. This study was designed to determine how severe nocturia influences daytime sleepiness, so we defined the severe nocturia group as the patients who had nocturia at least twice a night. However, there are few reports about daytime sleepiness with nocturia, so we expect this study has contributed basic data on the subject.

Conclusions

LUTS with nocturia and sleep quality closely affect each other. Particularly, severe nocturia had an impact on abnormal daytime sleepiness in patients with LUTS/BPH. Therefore, clinicians should consider their patients' nocturia and sleep problems or QoL as well to aim to provide more satisfying outcomes.

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