

## NOCTURIA VERSUS INSOMNIA OR SLEEP APNEA SYNDROME: COMPARISONS OF PATIENT CHARACTERISTICS IN OUTPATIENT CLINICS

### Hypothesis / aims of study

Cumulative evidence has revealed that nocturia/nocturnal voiding is closely related to several sleep disorders, especially insomnia and sleep apnea syndrome (SAS). However, patients who are bothered by nocturia consult a urologist, and never consult a neurologist. Therefore, patients with nocturia must be different from patients with insomnia or SAS from several aspects. In this study, we attempted to elucidate the differences between patients with nocturia and patients with insomnia or SAS in respective outpatient clinics.

### Study design, materials and methods

A total of 98 patients with nocturia who consulted urologists and 41 patients with nocturia and 51 with SAS who consulted neurologists were enrolled in this study. Insomnia and SAS were diagnosed according to the criteria of the American Academy of Sleep Medicine. At the first visit, all patients completed the International Prostate Symptom Score (I-PSS) for lower urinary tract symptoms, Pittsburgh Sleep Quality Index (PSQI) for sleep status and Medical Outcome Study Short-Form 36 (SF-36) for general health-related quality of life as routine initial assessments. These questionnaires were validated for use in Japan. We qualitatively compared the characteristics and the results of these questionnaires between the patients with nocturia and those with insomnia or SAS. The chi-square test, Student's t-test and Mann-Whitney U-test were used for statistical analyses. Values of  $P < 0.05$  were considered statistically significant.

### Results

Male dominance in patients with nocturia was significantly higher than in those with insomnia (84% vs. 49%,  $P < 0.001$ ), but similar to that in patients with SAS (75%,  $P = 0.18$ ). The patients with nocturia were significantly older than those with insomnia ( $73.2 \pm 7.5$  vs.  $49.8 \pm 17.2$  years,  $P = 0.037$ ) and those with SAS ( $52.9 \pm 14.4$  years,  $P = 0.004$ ). Regarding lower urinary tract symptoms, almost all of the seven individual symptoms in the I-PSS and the I-PSS quality of life score were higher in the patients with nocturia than in those with insomnia and SAS (Figure 1). Regarding sleep status, the patients with nocturia had better scores than those with insomnia in all seven domains of the PSQI except for sleep disturbance, but were worse in the sleep latency, sleep efficiency and sleep disturbance domains and better in the sleep duration and daytime dysfunction domains than the patients with SAS (Figure 2). Regarding general health-related quality of life, the patients with nocturia were significantly better in the role physical domain, and marginally better in the vitality, role emotional and mental health domains than the patients with insomnia, but significantly worse in the mental health domain and marginally worse in the vitality domain than the patients with SAS (Figure 3).

### Interpretation of results

The patient characteristics, status of lower urinary tract symptoms, sleep status and general health-related quality of life were obviously different among patients with nocturia, insomnia, and SAS according to the respective features of the disorders.

### Concluding message

Nocturnal voiding is the main cause of sleep disturbance, and conversely, insomnia can induce nocturnal voiding. Similarly, SAS can induce nocturnal voiding. Despite such close associations between nocturnal voiding and insomnia/SAS, patients with nocturia, those with insomnia and those with SAS had individual characteristics.

Figure 1. Lower urinary tract symptoms assessed using the I-PSS

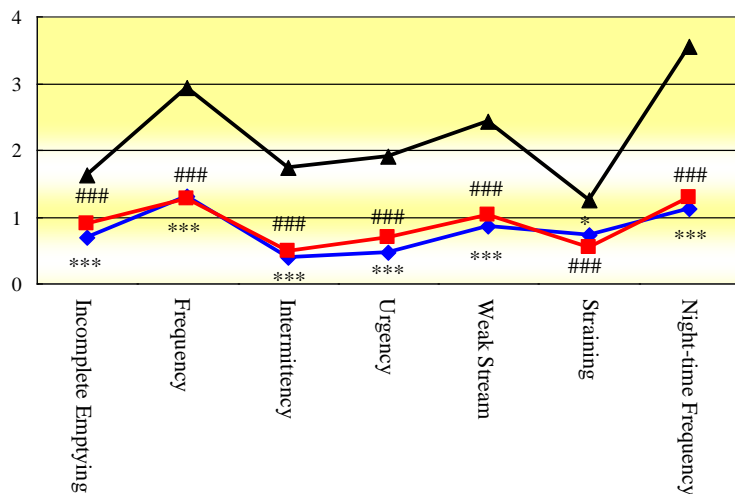


Figure 2. Sleep status assessed using the PSQI

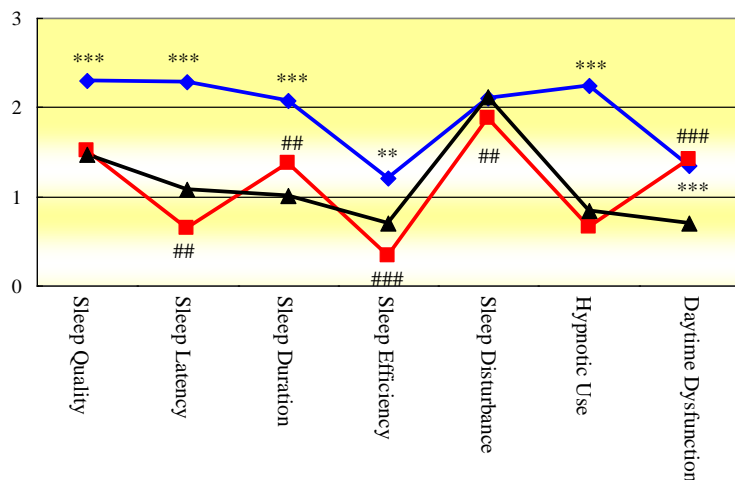
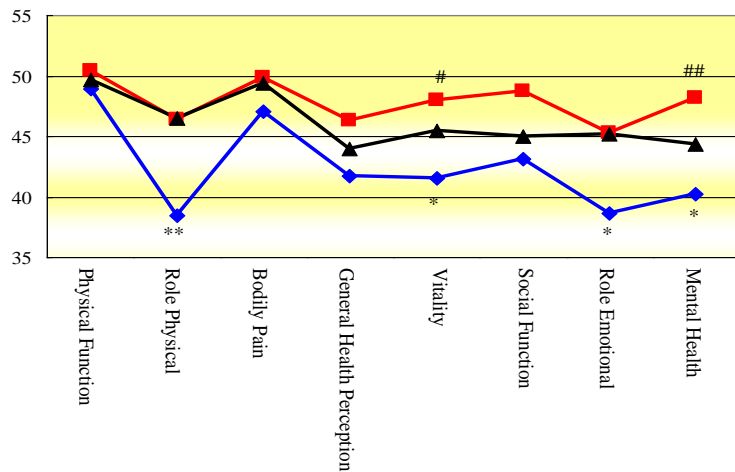


Figure 3. General health-related quality of life assessed using the SF-36



Black lines: patients with nocturia; Red lines: patients with insomnia; blue lines: patients with SAS.

\* $P < 0.1$ , \*\* $P < 0.05$ , \*\*\* $P < 0.01$ , nocturia versus insomnia.

# $P < 0.1$ , ## $P < 0.05$ , ### $P < 0.01$ , nocturia versus SAS

Specify source of funding or grant	None
Is this a clinical trial?	Yes
Is this study registered in a public clinical trials registry?	No
Is this a Randomised Controlled Trial (RCT)?	No

<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	No
<i>This study did not require ethics committee approval because</i>	data in this study was obtained as routine initial assessment in clinics.
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	No