



Platinum Priority – Editorial

Referring to the article published on pp. 78–84 of this issue

Nocturia and Quality of Life

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1. Introduction

The subject of nocturia has rightly received more and more attention when it became clear how much it can affect one's life.

Nocturia has been defined as the complaint of waking at night one or more times to void [1]. One nocturnal void is often considered within normal limits, particularly in the elderly, but even one nocturnal void can be experienced as bothersome by some. At least two nocturnal voids are, in general, considered as definitely lowering quality of life (QoL) [2]. Nocturia is equally common in men and women, and although its prevalence increases with age [3], a significant proportion of younger people are also affected.

Nocturia can have different causes, such as high fluid intake, especially caffeinated drinks and alcohol; nocturnal polyuria; too small bladder capacity, as in overactive bladder; and incomplete bladder emptying. It can be one of the causes of sleep disturbance in such diseases as Parkinson and multiple sclerosis [4]. A causative relation has been shown with sexual, physical, or emotional abuse [5].

Nocturia induces sleep fragmentation and may therefore lead to *shortage of sleep* problems. In older men it is considered the most frequent cause of disturbed sleep continuity.

2. Sleep and its necessity for humans

Although there are considerable interindividual variations in the amount of sleep required, one usually needs, on average, 8 h of sleep per night. Sleep is a dynamic brain process that is the result of two largely independent mechanisms: the circadian rhythm and the homeostatic drive to sleep. To have sufficient sleep is a prerequisite for

normal functioning in the long run. Shortage of sleep can lead to side effects, some of which can be dangerous.

2.1. Normal sleep pattern in adults

During sleep, two periods can be differentiated: rapid eye movement (REM) sleep and nonrapid eye movement (non-REM) sleep. During REM periods, brain activity is high, muscle tone is low, irregular breathing and increased heart rate occur, and lively dreams with erections can be noticed. REM episodes are believed to contribute to psychological rest and emotional well being, and to bolster memory. During normal sleep, REM periods compose almost a quarter of total sleep time. Non-REM sleep (three quarters of total sleeping time) is thought to give physical rest and to improve the immune system. This non-REM period starts with the shift from being awake to sleeping, which takes 3 to 5 min. Its physiologic value seems limited. The transit into deeper sleep follows the non-REM period. The deepest stages of sleep with the highest arousal threshold compose approximately 25% of total sleep time. This deep sleep is thought to be the key period in the daily process of restitution.

During a normal night, there are three to six non-REM/REM cycles, which each last between 90 and 120 min. As the night goes by, the deep-sleep stages decrease and REM periods increase. Deep sleep thus predominates during the first 3–4 h of the night. This division in total sleeping time is considered important. If one awakens spontaneously during REM sleep, there is not much harm done and one can still feel rather rested. If one is awakened during deep sleep, the negative effect is more important. Needing to go to the toilet can be a reason to waken during such crucial period.

Even if one succeeds in falling asleep again, this will often not be a deep sleep. Apart of some confusion at awakening, during the following day tiredness will often be experienced, and poorer performance and less concentration can occur.

2.2. *Impact of aging on sleep*

With aging, there is a gradual decline in overall sleep time. Although older people spend more time in bed, the total sleep time decreases. Often this can result in daytime napping. In older people, deep sleep can decrease and even completely disappear.

3. **Nocturia and sleep: consequences**

Nocturia is the most important cause of disturbed sleep in older men. Increased sleep disturbances, such as frequent awakenings and poor sleep, are related to the severity of nocturia.

3.1. *Impact of nocturia and/or disturbed sleep on daytime energy, concentration and performance, and overall feeling of health*

Not only is the quality of sleep related to the number of nocturnal voids, the perceived daytime QoL and general feeling of health also negatively relate to the number of nocturnal voids because of the effects on concentration, mood, and performance of daily life activities. The consequences affect not only the individual but also his partner and family as well as society, through reduced productivity at work and higher number of sick days.

3.2. *Serious (longer term) consequences of nocturia/disturbed sleep*

Increased daytime fatigue and concentration loss, as a consequence of nocturia-related sleep problems, lead to increased risk of accidents at work and/or on the road, and falls and fractures. These involve increased health care costs. For the elderly it can be a direct cause of loss of independence and need of institutionalization, which is, again, expensive for society and not often appreciated by the person involved.

Nocturia and sleep deprivation can also lead to depression, as well demonstrated in the study by Kapelian et al [6].

Because undisturbed sleep is now accepted to be essential for optimal functioning of the endocrine, metabolic, and immune systems, sleep disturbance can increase the risk of type 2 diabetes, cardiovascular diseases (eg, cardiac arrhythmia, angina pectoris, and myocardial infarction), and obstructive sleep apnea. Mortality may be increased in elderly patients with disturbed sleep.

4. **Evaluation tools**

Frequency-volume (FV) charts are recommended for routine use in clinical practice to determine whether nocturia is a result of excessive urine production at night,

or of small voided volumes due to bladder problems, or a combination of these [1].

The International Prostate Symptom Score (IPSS) tool has one question reporting on nocturia. For this question the patient has to indicate how many times over the past month he typically has had to get up to urinate from the time he went to bed at night until the time he got up in the morning. This can range from none (score 0) to five or more times (score 5) per night. A weak association has been found between the IPSS for nocturia, urgency, and counterparts on a FV chart [7]. The number of self-reported nocturnal voids tended to be overestimated. These discrepancies were partly explained by the patients' QoL ratings, which reduced the level of variation between IPSS score and FV variables and accounted for some of the overestimation [7]. The nocturia QoL questionnaire (N-QoL) offers more possibilities for evaluation. With its 13-item self-report questionnaire (sleep/energy domain of seven questions, bother/concern domain of six questions), it should permit a more in-depth evaluation of nocturia and its effect on QoL. Other evaluation methods include the Overactive Bladder Questionnaire (OAB-q), and the Medical Outcomes Study (MOS) sleep scale [8]. In a large group of men, the number of nocturia episodes was significantly associated with the OAB-q symptom score and symptom bother. Among the categories of the MOS sleep scale, sleep index I, sleep disturbance, adequacy of sleep, and somnolence were significantly associated with an increased number of nocturia episodes [8].

5. **Impact of treatment for lower urinary tract symptoms/benign prostatic obstruction on nocturia, sleep, and health/quality of life**

Clinical research data have shown a positive impact on the IPSS nocturia score in lower urinary tract/benign prostatic obstruction with intake of an alpha blocker [9] and with transurethral resection of the prostate. If nocturia is caused by nocturnal polyuria, the number of voids per night can be reduced with desmopressin, which has been shown to improve sleep duration considerably, especially during the period of deep sleep [1].

Behavioral modification programs have been developed that consist of watching videos about the normal physiologic functions of storing and emptying urine, and regulation of fluid intake; explaining by giving specific examples; and discussion with a specialized nurse practitioner, followed by reinforcement if needed. The results in men and women were good; reducing the need to void from two to one episodes at night could significantly reduce bother and improve QoL [10].

Other treatment modalities, as for overactive bladder have been shown to have a possible impact on nocturia and its QoL consequences.

6. **Conclusion**

Though already accepted by urologists as clinically very important, there are still popular and medical misconceptions about nocturia. One must acknowledge that nocturia is

an important challenge for health that can lead to general morbidity, negative QoL, and serious personal, psychological, and social consequences. Nocturia should get full attention from health care providers and clinicians. Diagnostics are available for proper evaluation in primary care. Treatment modalities exist. Further research is needed to better define which diagnostics and treatments are most appropriate for an individual patient.

Conflicts of interest: The author has consulted for Pfizer, Eli Lilly, Novartis, Kyowa Hakko, Tanabe Seiyaku, and Sumitomo. He has received speaking honoraria from Astellas, Pfizer, Novartis, Eli Lilly, and Ismar Healthcare. He has participated in clinical trials for Astellas, Pfizer, GSK, Novartis, Esteril, Allergan, Schwarz, Jansen-Cilag, Esteve, Yamanouchi, Parexel, Glaxo, PPD, Roche, Fabre, Schering, and Pharmacia. His research has received financial support from Procter & Gamble, Pfizer, and Kimberley-Clark; and support in the form of fellowships, travel grants, gifts, or in-kind donations from Astellas, Aventis, Zambon, Glaxo, Innovex, PPD, Synthelabo, Parexel, and Bayer.

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