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ELDER CARE

A Resource for Interprofessional Providers

Nocturia in Older Adults

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Nocturia, defined as voiding at least twice per night that interrupts sleep, is a common complaint in older adults. The prevalence among those 70 years and older is reported to be 69-93% in men and about 75% in women. Because it is so common, clinicians often dismiss nocturia as a normal consequence of aging and provide limited advice on how to deal with it.

The effects of nocturia on quality of life, however, can be profound. It can affect personal relationships due to lack of sleep and associated fatigue. Nocturia can alter self-age concept (“It makes me feel old”), and can lead to depression. Nocturia can also be dangerous, as falls may occur during nighttime awakenings and result in hip fractures or even death. Nighttime awakenings associated with nocturia can affect the sleep of family members and bed partners. It is not surprising, therefore, that nocturia is cited among the reasons why older adults are admitted to care homes.

The cause of nocturia in older adults is factorial. Age-related changes in the urinary system, along with a variety of hormonal changes (Table 1) contribute to nocturia. In addition,

medical conditions and medications can increase urine production or predispose to nighttime awakenings and thus increase the risk of nocturia (Table 2). Psychological conditions (e.g., depression, family stress) may also contribute to nighttime awakenings.

Table 2. Conditions and Medications Associated with Nocturia

Medical Conditions	Diabetes mellitus Heart failure Hypertension Obesity Obstructive sleep apnea Prostate enlargement/ Prostate cancer Recurrent cystitis/ Neurogenic voiding dysfunction Restless leg syndrome Spinal stenosis Hypoalbuminemia Bladder cancer Depression
Medications	Antihistamines Beta blockers Calcium channel blockers Cholinesterase inhibitors Diuretics taken in the evening Selective serotonin-reuptake inhibitors Statins

Table 1. Some Factors That Contribute to Nocturia in Older Adults	
Age-associated changes	Decreased ability to postpone urination Decreased bladder compliance Decreased functional bladder capacity Decreased maximum urinary flow rate Detrusor overactivity Increased post-void residual volume
Increased urine production at night	Increased nocturnal catecholamine levels Increased nocturnal natriuretic peptide levels Increased nocturnal sodium excretion Decreased nocturnal antidiuretic hormone levels

Evaluation

History and physical are aimed at identifying medical conditions and medications that predispose to nocturia (Table 2) and which, if treated, may lead to resolution of the problem. Check renal function, urinalysis, serum glucose, and post-void residual urine volume. Ask about patterns of fluid

TIPS FOR DEALING WITH NOCTURIA

- Don't underestimate the importance of nocturia. It can have a major effect on quality of life for patients and their families, and nighttime bathroom use poses a risk of falls.
- When evaluating a patient with nocturia, ask about medical conditions that might be contributing (Table 2) because treating those conditions may lessen nocturia, as well as asking about personal or family stress resulting from nocturia.
- For patients with lower urinary tract symptoms attributable to prostate enlargement or other urologic or gynecologic abnormalities contributing to nocturia, treat those conditions or refer to specialty care for treatment.

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Continued from front page

intake and the presence of other urinary complaints. A voiding diary can help characterize typical daily timing and volume of voids, episodes of incontinence, and the frequency and volume of fluid intake. Treatment (Table 3) can then be initiated and the diary can serve as a baseline.

Non-Pharmacologic Treatment

Avoidance of nighttime fluid intake, including alcohol and caffeine, may have benefit, as may voiding before bed. The use of compression stockings and afternoon leg elevation can decrease fluid retention and result in less nighttime urination. Moderate daytime exercise, reducing non-sleep time spent in bed, and keeping a warm bed to decrease cold-induced diuresis have all been shown to improve sleep quality. These approaches to treatment are rarely effective alone, however, and medications are frequently needed.

Pharmacotherapy

For patients with nocturia related to prostate hyperplasia, alpha blockers and 5-alpha reductase inhibitors may be helpful. Persistent symptoms may warrant urology referral.

For those with nocturia related to overactive bladder (i.e., urgency with a decreased ability to store urine), anti-muscarinic agents such as darifenacin, oxybutynin, tolterodine, trospium, and solifenacin can be effective, but should be used with caution in older adults due to their anticholinergic side effects. Beta-3-agonists such as mirabegron or vibegron

increase bladder capacity by relaxing bladder smooth muscle. Though they do not have anticholinergic side effects, the most common side effect is hypertension.

Desmopressin nasal spray (Noctiva) is FDA approved for treating nocturnal polyuria in adults who awaken at least 2 times/night to urinate. However, this drug can cause severe hyponatremia, resulting in an FDA Black Box Warning. The 2019 American Geriatric Society's Beers list gives a strong recommendation against prescribing this medication to older adults. It is also contraindicated in patients taking loop diuretics or glucocorticoids, and with glomerular filtration rates <50 ml/min.

Diuretics such as hydrochlorothiazide can be useful to shift the diuresis from nighttime to daytime. They are a good choice for patients who have concomitant hypertension. When used to treat nocturia, the diuretic should be taken at least 8 hours before bedtime to prevent urine accumulation in the bladder before the early sleeping hours.

Other approaches to treating overactive bladder include injecting botulinum toxin into the detrusor muscle via cystoscope (successful in selected patients) and posterior tibial nerve stimulation (reduces nocturia episodes by 25%). These interventions may be appropriate for patients who are not responsive to other treatments.

Table 3. Approach to Treatment of Nocturia

General Approach	Non-Pharmacologic	Pharmacologic
<ul style="list-style-type: none"> • Address underlying medical problems • Keep a voiding diary • Check for medications that contribute to nocturia • Refer to specialist (urologist for prostate hyperplasia, sleep specialist for obstructive sleep apnea, etc.) as needed 	<ul style="list-style-type: none"> • Avoid caffeine and alcohol • Afternoon leg elevation • Avoid nighttime fluid intake • Compression stockings • Moderate exercise • Pelvic floor exercises (Kegel) • Posterior tibial nerve stimulation • Reduce non-sleep time in bed • Warm bed • Weight loss • Adjust timing of medication; e.g diuretics 	<ul style="list-style-type: none"> • Alpha blockers and 5-alpha reductase inhibitors for prostate hyperplasia • Anti-muscarinics or beta-3 agonists for overactive bladder • Botulinum toxin in selected refractory cases • Desmopressin (see text) • Diuretics • Vaginal estrogens <p>Acknowledgement: Jerry Ciocon, M.D. was a co-author on a previous edition of Elder Care on nocturia</p>

References and Resources

- Asplund R, et al. . Nocturia, depression and antidepressant medication. *BJU Int.* 2005 Apr;95(6):820-3.
- Bosch, JL. Weiss, J. The prevalence and causes of nocturia. *J Urol.* 2010;184(2):440-6.
- FDA. Summary review of regulatory action (Desmopressin/Noctiva): https://www.accessdata.fda.gov/drugsatfda_docs/summary_review/2017/201656Orig1s000SumR.pdf
- Fujimoto M, Hosomi K, Takada M. Statin-associated lower urinary tract symptoms: data mining of the public version of the FDA adverse event reporting system, FAERS. *Int J Clin Pharmacol Ther.* 2014 Apr;52(4):259-66.
- Kennelly MJ, Rhodes T, Girman CJ, Thomas E, Shortino D, Mudd PN Jr. Efficacy of Vibegron and Mirabegron for Overactive Bladder: A Systematic Literature Review and Indirect Treatment Comparison. *Adv Ther.* 2021 Nov;38(11):5452-5464. doi: 10.1007/s12325-021-01902-8. Epub 2021 Sep 18. PMID: 34537953; PMCID: PMC8520873.
- Moossdorff-Steinhausser HF, Berghmans B. Effects of percutaneous tibial nerve stimulation on adult patients with overactive bladder syndrome: a systematic review. *NeuroUrol Urodyn.* 2013 Mar;32(3):206-14.
- Oelke M, De Wachter S, Drake MJ, Giannantoni A, Kirby M, Orme S, Rees J, van Kerrebroeck P, Everaert K. A practical approach to the management of nocturia. *Int J Clin Pract.* 2017 Nov;71(11):e13027. doi: 10.1111/ijcp.13027. Epub 2017 Oct 5. PMID: 28984060; PMCID: PMC5698733.
- Varilla V, et al. Nocturia in the elderly: a wake-up call. *Cleve Clin J Med.* 2011; 78:757-64

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