

## NOCTURNAL POLYURIA IS A KEY FACTOR IN NOCTURIA

### Hypothesis / aims of study

Nocturia is one of the most prevalent urological symptoms. The aim of the present study was to assess the frequency of nocturnal polyuria (NP) in individuals with nocturia (waking at night one or more times to void) and to determine if it differs with gender or age (< 65 years and > 65 years).

### Study design, materials and methods

The analyses were performed on basal 7-day frequency/volume charts from 1,003 individuals with nocturia (519 males, 484 females)  $\geq 18$  years who were recruited into three short-term studies investigating the efficacy and safety of oral desmopressin (1, 2, 3). All patients had  $\geq 2$  voids per night by history. Night was defined as the period of sleep. Nocturnal polyuria was defined in 3 ways: one was that advocated by the ICS- the proportion of total urine output excreted at night. The night time urine output excluded the last void before sleep but included the first void in the morning. Since the normal range for this value increases with age from < 20% to <33% and the mean age of our patients was 63 years, we used a percentage >33% as indicating NP. The other two definitions of NP were based on absolute rates of urine production before and after adjustment for differences in patient size. In this case, NP was defined as a nocturnal diuresis rate > 0.9 mL/min or > 0.9 mL/min/70 kg based on values previously reported for healthy, adults without nocturia.

### Results

The frequency of NP in patients providing records that were evaluable for each of the 3 definitions (N) ranged from 74 to 85%. If the patients with non-evaluable records were included as non-polyurics, the proportion with polyuria decreased but still ranged from 63 to 73%.

Total	N	NP Present
Relative nocturnal polyuria (> 33% of total 24-h urine volume)	845	74%
Absolute nocturnal polyuria ( $\geq 0.9$ mL/min)	869	85%
Absolute nocturnal polyuria weight adjusted ( $\geq 0.9$ mL/min/70kg)	869	79%

The frequency of NP in patients with evaluable records above the age of 65 years was variably greater than in those below 65 years by all 3 definitions. Even so, most of the young nocturics also had NP with the highest relative values yielded by the two absolute definitions. As before, when the patients with non-evaluable records were included as non-polyurics, the incidence of NP decreased in both age groups but still ranged from 52 to 71% in the young and from 72 to 77% in the old.

Age	< 65 years N      %NP	> 65 years N      %NP
Relative NP (> 33% of total 24-h urine volume)	63%	90%
Absolute NP ( $\leq 0.9$ mL/min)	83%	86%
Absolute NP weight adjusted ( $\leq 0.9$ mL/min/70kg)	76%	89%

The frequency of NP in male and female patients with evaluable records differed slightly depending on the definition but was not different overall. The largest difference was observed when the weight adjusted absolute definition was used. This resulted in a modestly lower proportion of NP in males than in females because the males tended to be heavier than the females. However, when the relative definition of NP was applied, the gender difference appeared to be reversed- i.e. it was slightly higher in males than females. When the patients with non-evaluable records were included as non-polyurics, the overall frequency of NP decreased in both genders but, depending on the definition was still 66 to 75% in males and 57 to 72% in females.

Gender	Males		Females	
	N	%NP	N	%NP
Relative NP (> 33% of total 24-h urine volume)		78%		70%
Absolute NP ( $\leq$ 0.9 mL/min)		84%		85%
Absolute NP weight adjusted ( $\leq$ 0.9 mL/min/70kg)		74%		84%

#### **Interpretation of results**

The majority of all nocturic patients of both sexes and all ages have nocturnal polyuria by any of the three most widely used definitions. This conclusion applies even if the highly conservative approach of arbitrarily designating all patients with non-evaluable records as non-polyurics is used. The frequency of NP is greater in the elderly than the young but the magnitude of the difference depends heavily on the definition employed. The frequency of NP in males and females also appears to depend on the definition used but overall it appears to be quite similar. Thus, in comparing studies of NP, it is important to consider the impact of the definition employed on the results. None of these analyses take into account possible variations in the duration of sleep.

#### **Concluding message**

Nocturia is one of the most troublesome symptoms of Lower Urinary Tract Symptoms (LUTS); it significantly compromises sleep and HRQoL. This study shows that the majority of all patients with nocturia have nocturnal polyuria. It emphasizes the importance of using frequency/volume charts, as the management of patients with nocturnal polyuria is likely to be different from that of patients without nocturnal polyuria.

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