

## EXPLORING NOCTURIA IN AN OLDER POPULATION

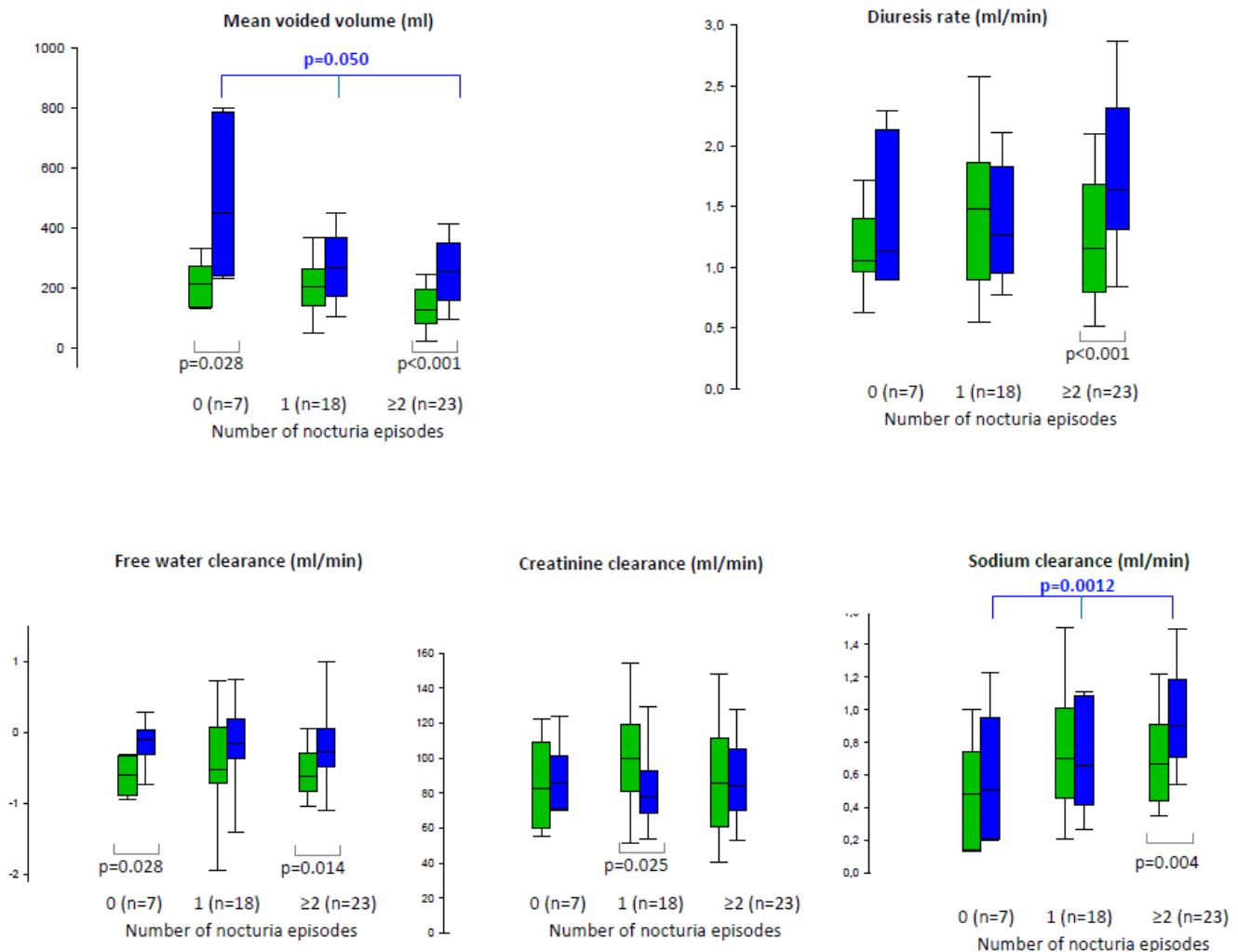
### Hypothesis / aims of study

Nocturia is a highly bothersome and prevalent lower urinary tract symptom, and also the most frequent cause of disturbed sleep in older people. Nocturia is considered as a clinically significant condition if it occurs two or more times at night because of the associated impact on quality of life, fall accidents and global health. This study aimed to clarify differences in parameters based on frequency volume charts (FVCs) and on daytime and nighttime urine samples according to the nocturia frequency in patients of 65 years and older.

### Study design, materials and methods

This prospective, observational study was conducted between February 2014 and July 2015. After a normal cognitive screening was obtained, patients of 65 years or older with urinary incontinence were asked to participate. There were no specific exclusion criteria. Study protocol comprised a FVC during 24 to 72 hours, a sober blood sample to determine serum sodium, creatinine and osmolality, and analysis of sodium, creatinine and osmolality on 5 daytime (10am, 1pm, 4pm, 7pm, 10pm) and 3 nighttime urine samples (01am, 04am, 07am) in order to calculate daytime and nighttime renal clearance of each of these substances ( $U_{\text{subst}} \times \text{urine flow} / P_{\text{subst}}$ ). Diuresis rate was calculated during this 24h urine collection and included both voided volume and incontinence weight. Descriptive parameters are represented as median, minimum and maximum. A p-value <0.05 was considered statistically significant.

**Figure 1: Mean voided volume, diuresis rate and clearance of free water, creatinine and sodium according to the number of nocturia episodes, during daytime and nighttime.**



### Results

A total of 4 men and 44 women, with a median age of 72 (65-84) years, were included. Based on the FVCs, patients were divided in 3 groups: no nocturia (n=7), one nocturia episode (n=18) and 2 or more nocturia episodes (n=23). Figure 1 shows a decrease in mean nocturnal voided volume with increasing number of nocturia episodes (no nocturia: 452ml (233-800), nocturia=1: 273ml

(117-460), nocturia  $\geq 2$ : 258ml (74-433);  $p=0.050$ ). Patients with 2 or more nocturia episodes show a significant increase in nocturnal diuresis rate ( $p<0.001$ ), which is not observed in patients with 0 or 1 nocturia episode. There was a significant increase in nighttime sodium excretion with increasing number of nocturia episodes ( $p=0.0012$ ), with a significant nighttime increase compared to daytime in patients with 2 or more nocturia episodes ( $p=0.004$ ).

#### Interpretation of results

This study demonstrated a decrease in functional bladder capacity and an increase in nocturnal urine production with increasing number of nocturia episodes. To explain changes in urine production in this population of older patients with urinary incontinence, we evaluated:

- *Free water clearance*: There was an increase in nocturnal free water clearance compared to daytime in patients without nocturia ( $p=0.028$ ), 1 nocturia episode (ns) and 2 or more nocturia episodes ( $p=0.014$ ). Therefore, changes in free water clearance could not explain the increase in nocturnal diuresis rate in patients with 2 or more nocturia episodes.
- *Creatinine clearance*: Patients with 1 nocturia episode showed a significant decrease in creatinine clearance during nighttime ( $p=0.025$ ), while this circadian rhythm was lacking in patients without nocturia and patients with 2 or more nocturia episodes, which may be related to associated comorbidities.
- *Sodium clearance*: There was a significant increase in sodium clearance with increasing number of nocturia episodes ( $p=0.0012$ ), and patients with 2 or more nocturia episodes showed a significantly higher nighttime sodium clearance compared to daytime ( $p=0.004$ ), which could explain the increase in nocturnal diuresis rate in these patients.

#### Concluding message

This is the first study evaluating parameters based on FVCs and on daytime and nighttime urine samples according to the nocturia frequency in patients of 65 years and older. This study demonstrated a decrease in functional bladder capacity and an increase in nocturnal urine production with increasing number of nocturia episodes, with an important role for nocturnal sodium excretion in patients with 2 or more nocturia episodes.

#### Disclosures

**Funding:** Denys MA receives an educational grant from Astellas, AMS, Allergan, Bard, Coloplast, Ferring, Pfizer and Medtronic + member of advisory board for Ferring **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Ethics Committee Ghent University Hospital **Helsinki:** Yes **Informed Consent:** Yes