

IMPACT OF DIURESIS ON LOWER URINARY TRACT SYMPTOMS: A PILOT-STUDY WITH RENAL BOTHER PROFILES

Hypothesis / aims of study

It is commonly accepted that lower urinary tract symptoms (LUTS) such as frequency, incontinence, bladder outlet obstruction symptoms and nocturia are related to disorders of the bladder, prostate or urethra. However, also urine production at the level of the kidneys may play a role and can therefore not be ignored when evaluating LUTS.

The aim of this study was to explore the value of the « Renal Bother Profile », a new screening tool developed to objectify the impact of diuresis on the presence of daytime and nighttime LUTS and the associated bother.

Study design, materials and methods

Healthy volunteers and patients referred to our hospital for a urologic consultation have been prospectively included in the study. Participants were asked to complete a 72h-frequency volume chart (FVC) by recording the volume and timing of every void during three 24h-periods (from first morning void on day 1 to the first morning void of day 2). In addition, they also had to fill in a Likert scale (0: no bother; 10: maximal bother) to evaluate the LUTS-associated bother. Three groups were defined: no/mild bother ($\text{Bother} \leq 2$) (group 1), moderate bother ($3 \leq \text{Bother} \leq 6$) (group 2) and strong bother ($\text{Bother} \geq 7$) (group 3). Each 24h-period was subdivided into a daytime (after waking up) and nighttime (after going to sleep) period (the first morning void was included in nocturnal urine volume, but not in nighttime frequency).

The data was analysed using SPSS statistics version 21. Variables were analysed using descriptive statistics (Median, interquartile range) and compared using non-parametric tests (Mann-Whitney U test).

Results

A total of 107 patients (60% female) with a median age of 59 (20-83) years were included. Each 24h-period of the 72h-FVC has been evaluated separately. Consequently, a total of 320 daytime and 320 nighttime periods have been studied (1 missing data). Comparison of results derived from FVC during daytime and nighttime according to the LUTS-associated bother are summarized in Table 1.

Interpretation of results

During daytime, participants with moderate LUTS-associated bother (group 1) showed a significantly higher fluid intake than those without or with mild bother (group 2) ($p=0,004$). This was also true when comparing group 1 and 3 ($p=0,03$).

Both during daytime and nighttime, those with higher diuresis rate had more bother related to LUTS than the others (during daytime: $p=0,004$ when comparing group 1 and group 2 and $p=0,001$ when comparing group 1 and 3). For nighttime, this finding was only significant when comparing participants without bother or mild bother with participants with moderate bother (group 2).

Maximal voided volume, which can be considered as the functional bladder capacity of participants, showed that during daytime, the lower the maximal voided volume was, the more bother the participants described ($p=0,008$ when comparing group 1 and 3). This was also true during nighttime when comparing groups 2 and 3 and groups 1 and 3 ($p<0,001$).

These results show the implication of diuresis in bother related to LUTS.

Concluding message

This is the first study evaluating LUTS-associated bother during daytime and nighttime, with a special focus on diuresis rate. We showed that not only bladder and prostate disorders need to be addressed when evaluating and treating LUTS, but also urine production has to be taken into account.

Table I: Comparison of results derived from FVC during daytime and nighttime according to the LUTS-associated bother

	Group 1: No/light bother	Group 2: Mild bother	Group 3: Strong bother	p-value 1 vs. 2	p-value 2 vs. 3	p-value 1 vs. 3
DAYTIME-ONLY						
Number of 24h-periods, n (%)	177 (53,3%)	93 (29,1%)	50 (15,6%)			
Gender, n (%)						
man	88 (50%)	30 (32%)	11 (22%)			
women	89 (50%)	63 (68%)	39 (78%)			
Age (years)	54 (42-65)	56 (43-65)	50 (42-64)			
Body mass index (kg/m²)	25 (22-28)	27 (24-30)	24 (21-29)			
Maximum voided volume (mL)	300 (200-450)	300 (200-400)	233 (190-350)	0.287	0.095	0.008
Fluid intake (mL)	1600 (1208-2050)	1850 (1470-2200)	1800 (1495-2235)	0.004	0.638	0.030
Diuresis during daytime (mL/h)	69 (51-88)	80 (55-113)	81 (66-120)	0.004	0.488	0.001
NIGHTTIME ONLY						
Number of 24h-periods, n (%)	220 (68,8%)	56 (17,5%)	44 (13,8%)			
Gender, n (%)						
man	104 (47,3%)	21 (37,5%)	4 (9,1%)			
women	116 (52,7%)	35 (62,5%)	40 (90,9%)			
Age (years)	55 (43-65)	56 (42-67)	49 (41-61)			
Body mass index (kg/m²)	25 (22-28)	27 (22-31)	24 (21-27)			
Maximum voided volume_{night}	355 (252-500)	350 (252-490)	255 (180-327)	0.910	<0.001	<0.001
Nocturia index*	1 (1-2)	2 (1-2)	2 (2-4)	<0.001	0.037	<0.001
Diuresis_{night} (mL/h)	62 (43-88)	84 (59-121)	70 (53-97)	<0.001	0.96	0.116
<i>Parameters are described as median (interquartile range), unless indicated otherwise</i>						
<i>* nocturia index = nocturnal urine production/maximum voided volume over 24h</i>						

Disclosures

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