

DIFFERENCE IN UROFLOWMETRY MEASUREMENTS BETWEEN NIGHT AND DAY WITH AGING.

Hypothesis / aims of study

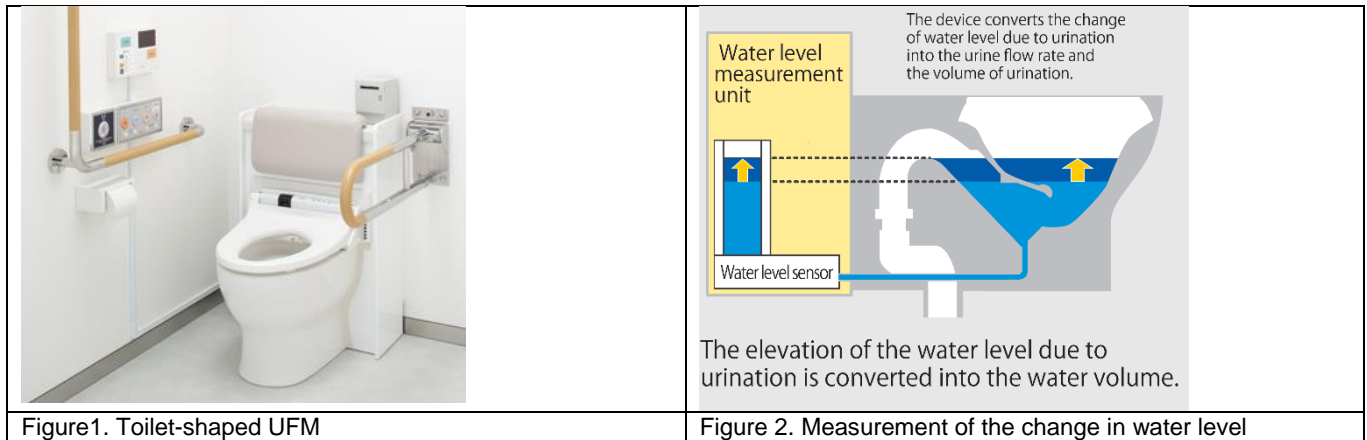
The number of episodes of nocturia increases with aging. Symptomatic rates of dysuria also increase with aging, and elderly patients claim that dysuria is worse at night than during the day. Little is known about changes in nighttime uroflowmetry measurements with aging as nighttime uroflowmetry measurement is difficult. Uroflowmetry is a noninvasive and relatively inexpensive method for urodynamic measurement, and is an indispensable and useful screening test for many patients with lower urinary tract dysfunction. The aim of this study was to clarify the difference in uroflowmetry measurements between nighttime and daytime according to the age of urology patients.

Study design, materials and methods

A total of 62 (45 male and 17 female) patients aged 39–88 years (mean age: 67.2 years) admitted to our Urology Department were enrolled in the study after giving informed consent. They underwent as many uroflowmetry measurements as possible during hospitalization. Seven patients had prostatic hypertrophy, and the evaluation was performed after holmium laser enucleation of the prostate. The other patients were treated for urological diseases other than lower urinary tract dysfunction. The patients were stratified into two age groups: 33–69 years (Group 1; 34 patients, mean age: 59.0±7.9 years); and 70–88 years (Group 2; 28 patients, mean age: 76.7±5.2 years).

All patients underwent uroflowmetry with a novel toilet-shaped uroflowmeter (Figure 1). This uroflowmeter (UM-100; TOTO Ltd., Japan) was developed in 2008 and is toilet-shaped, allowing uroflowmetry to be performed during usual urination, thus minimizing any strain on the patient. The device measures the relationship between water level and water volume, and converts the change in water level on urination into the urine flow rate and the volume of urine (Figure 2). This novel toilet-shaped uroflowmeter provides more accurate results for micturition time and average flow rate than a conventional uroflowmeter especially in female patients. These objective measurements were divided into nighttime (21:00 to 6:00) and daytime (6:00 to 21:00) groups, because 21:00 was the time for lights out in the ward.

The following uroflowmetry measurements were compared: voided volume, micturition time, maximum flow rate, and mean flow rate. The study was designed to have 90% power between two groups and two time periods. Alpha was set at 0.05. The two-tailed Student *t* test and paired *t* test were used for statistical analysis. The required sample size was 36.



Results

A total of 3284 records were analyzed and 547 of these were during the nighttime. The median number of uroflowmetry measurements was 40 (range, 10–335). Voided volume during both nighttime and daytime in Group 1 was significantly greater than in Group 2 (p=0.041 and p=0.0027, respectively). Maximum and average flow rates in Group 1 were also significantly greater than in Group 2 (Table 1). Micturition time in Group 2 tended to be longer than in Group 1, but this was not significant. On the other hand, voided volume in both Group 1 and Group 2 during nighttime was significantly greater than during daytime (p<0.001 and p=0.0043, respectively). Micturition time in Group 2 during nighttime was significantly longer than during daytime, but in Group 1 this was not significant.

Table 1. Uroflowmetry measurements by age according to night and day (mean \pm SD)

			Group (33–69y)	1 Group (70–88y)	2 p value (Group 1 - 2)
voided volume (mL/time)	night		255.5 \pm 119.2	194.1 \pm 99.7	0.041
	day		200.4 \pm 74.8	146.0 \pm 51.9	0.0027
		p(N - D)	<0.001	0.0043	
micturition time (s)	night		32.1 \pm 21.1	39.2 \pm 24.5	0.24
	day		28.9 \pm 23.3	29.7 \pm 27.7	0.9
		p(N - D)	0.20	0.035*	
maximum flow rate (mL/s)	night		18.8 \pm 8.3	13.9 \pm 7.4	0.022
	day		19.1 \pm 8.0	13.3 \pm 5.9	0.0034
		p(N - D)	0.65	0.31	
average flow rate (mL/s)	night		11.1 \pm 4.9	7.9 \pm 3.7	0.0068
	day		11.5 \pm 4.8	7.88 \pm 3.2	0.0016
		p(N - D)	0.29	0.96	

nighttime: 21:00 to 6:00; daytime: 6:00 to 21:00

Interpretation of results

In this study, patients were relatively old, with a mean age of 67.2 years. The toilet-shaped uroflowmeter allowed easy performance of several uroflowmetry measurements for these patients. Voided volume and flow rate during daytime and nighttime decreased with age. However, micturition time increased with age in the nighttime, and micturition time in the older age group during nighttime was about 10 seconds longer than during the daytime. This may be one reason why elderly patients claim they have greater dysuria during the night than during the day. With the methodology used in this study, several nighttime and daytime uroflowmetry measurements were obtained from the same patient. However, there are some limitations to this study. The number of patients was relatively small and all patients were hospitalized. Further studies are needed to verify these results.

Concluding message

This study indicated that micturition time during nighttime became longer than during daytime in older age, while voided urine volume and flow rate decreased with age in both the nighttime and daytime.

References

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Disclosures

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