

Voiding Pattern in Asymptomatic Indian Males Age 20 to 70 Years**Rohit Upadhyay¹, Khalid Mahmood², Rakesh Kumar³, Shashi Prakash⁴, Nandesh⁵**¹Additional Professor, Department of Urology, IGIMS Patna, Bihar, India²Additional Professor, Department of Urology, IGIMS Patna, Bihar, India³Senior Resident, Department of Urology, IGIMS Patna, Bihar, India⁴Senior Resident, Department of Urology, IGIMS Patna, Bihar, India⁵Senior Resident, Department of Urology, IGIMS Patna, Bihar, India

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Abstract**Aim:** The aim of the present study was to assess the voiding pattern in asymptomatic Indian males.**Methods:** The present study was conducted at department of Urology, IGIMS Patna, Bihar, India and 200 ambulatory men who considered themselves to have normal urinary function were recruited. Interested participants were asked to complete a screening symptom questionnaire.**Results:** A total of 200 asymptomatic males returned interpretable 24-hour diaries. Median age was 36 years (range 18 to 68). Subjects voided a median of 7 times in 24 hours (range 2 to 21) with 95% voiding fewer than 12 times daily. Median 24-hour urine volume was 1,650 ml (range 290 to 6,840). Key findings were the fact that subjects reported a median of 6 voids during 24 hours (range 2 to 21) with 95% voiding fewer than 12 times daily. Of the 200 men providing QOL ratings 120 (60%) were delighted, 60 (30%) were pleased, 16 were mostly satisfied, 4 were mixed unhappy. These 271 men had recorded a total of 261 I-PSS values with a median score of 2 (range 0 to 22), and with the distribution of I-PSS values within QOL categories as expected.**Conclusion:** Our results broadly agree with the sparse data from other countries suggesting that the use of a cutoff of 8 daily voids to define abnormal urinary frequency may not usefully discriminate between normal and abnormal urinary function. Furthermore, since urinary diary variables depend on patient characteristics, including age and are likely also to depend on climatic and social factors the application of a single set of normative values to all men is probably inadvisable.**Keywords:** urinary tract, voiding, urination disorders, men

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Introduction

Voiding dysfunction is defined by the International Continence Society and International Urogynecological Association as “abnormal, slow, and/or incomplete micturition” as diagnosed by symptoms and urodynamic investigations. [1] Abnormal, slow urine flow rates and abnormally high post-void residuals are the basis of this diagnosis, which should be based on repeated measurements to confirm abnormality. Lower urinary tract symptoms (LUTSs) is the term used to describe all types of voiding dysfunction, although no such correlation exists between symptoms and underlying pathophysiology. [2] In older men, an enlarged prostate usually contributes to LUTSs, but only about one-third of the men with LUTSs >55 years of age meet the diagnostic criteria for benign prostatic obstruction. About half of the men have detrusor overactivity and a smaller number have detrusor underactivity. [3] Although chronic LUTSs

are not uncommon, young men are usually empirically diagnosed as having chronic prostatitis, prostatodynia, or psychological voiding dysfunction because of negative findings on the physical or laboratory examinations. [4,5]

Bellina et al [6] showed that dysfunctional voiding may arise in women who work long hours and choosing not to urinate. Yang et al [7] reported a similar finding that 21% of young men with voiding dysfunction had habitually neglected to urinate despite a full bladder because they were busy with work. Fan et al [8] showed that women (mean age 48 years) with dysfunctional voiding experienced a greater degree of depression and anxiety as compared to asymptomatic controls, but the psychological profiles of young men with chronic voiding dysfunction are unknown. In type 2 diabetic patients aged <45 years, even though the LUTSs are

more common than in the control group, the peak urinary flow rate (Qmax) and post-void residual (PVR) are similar in both groups, indicating that diabetes is not a risk factor for voiding dysfunction in its early stages. [9]

The treatment options for voiding dysfunction in young men include watchful waiting, conservative treatment, medical treatment, and surgical treatment. Watchful waiting is indicated in patients without obvious symptoms and without evidence of upper or lower urinary tract function deterioration. Recently, Minassian et al [10] have demonstrated that dysfunctional voiding in childhood may predict bladder control problems as the child becomes a woman, including urge incontinence and mixed incontinence.

The aim of the present study was to assess the voiding pattern in asymptomatic Indian males.

Materials and Methods

The present study was conducted at department of Urology, IGIMS Patna, Bihar, India for one year and 200 ambulatory men who considered themselves to have normal urinary function were recruited. Interested participants were asked to complete a screening symptom questionnaire. Subjects with any positive response to the screening questionnaire were excluded from further participation. After they were enrolled subjects responded to the American Urological Association International Prostate Symptom Score (I-PSS). They were asked not to change their usual fluid intake or voiding habits during the 24 hours of study. Subjects recorded the time of morning awakening and of retiring at night. Frequency-volume charts began with the first daily void and finished 24 hours later. Measuring cups graduated in ml were provided.

Age, body mass index (BMI) and race were recorded. Diary variables were total urinary frequency (number of daytime and nighttime voids),

total fluid intake, voids per fluid intake, total voided urine volume, maximum and mean voided volumes, and daytime and nighttime diuresis rates calculated for the 24-hour study period for each subject in an effort to understand the determinants of urinary frequency in this sample population. Daytime urine output was defined as the total urine volume after the first morning void through the last void before retiring. Nighttime urine output was defined as the total urine volume voided during the night and during the first void of the next morning. The daytime diuresis rate in ml per minute was calculated by dividing daytime urine volume by the total number of minutes between the first and last voids. The nighttime diuresis rate was calculated by dividing nighttime urine volume by the number of minutes between the last void before bed and the first void of the following morning. Subject responses to the American Urological Association I-PSS were also analyzed.

Data was analyzed using the Statistical Package for the Social Sciences, version 11.0 for PC (SPSS, Inc., Northbrook, Illinois). Multivariate linear regression analysis was done with urinary frequency as the dependent variable using the independent variables patient age, race, BMI, total urine volume, fluid intake, diuresis rates and mean voided volume. Multivariate linear regression analysis was also done with I-PSS as the dependent variable using independent variables identical to those of linear regression analysis. Logistic regression was used to determine predictors of nocturia as a dependent variable using independent variables identical to those of linear regression analysis. Multivariate linear and logistic regressions were used to analyze associations between voiding diary data and patient characteristics with results considered significant at the 5% level.

Results

Table 1: Urinary habits of asymptomatic males

| Variables | Median |
|----------------------------------|--------|
| No. subjects (characteristic) | 200 |
| Age | 36 |
| Total voided vol (ml) | 1,650 |
| Total voids/24 hrs | 6 |
| Mean voided vol (ml) | 240 |
| Max voided vol (ml) | 380 |
| Daytime diuresis rate (ml/min) | 1.2 |
| Nighttime diuresis rate (ml/min) | 0.9 |
| No. of nocturnal voids | 0 |
| Total I-PSS | 2 |

A total of 200 asymptomatic males returned interpretable 24-hour diaries. Median age was 36 years (range 18 to 68). Subjects voided a median of 7 times in 24 hours (range 2 to 21) with 95% voiding fewer than 12 times daily. Median 24-hour urine volume was 1,650 ml (range 290 to 6,840).

Table 2: Values of 24-hour urinary diary variables and IPSS

| Diary Variables | No. Subjects | Median | IQR |
|----------------------------------|--------------|--------|-------------|
| Total voided vol (ml) | 200 | 1,650 | 1,151–2,218 |
| Total voids/24 hrs | 200 | 6 | 6–9 |
| Mean voided vol (ml) | 200 | 240 | 181–333 |
| Max voided vol (ml) | 200 | 380 | 276–550 |
| Total fluid intake (ml) | 200 | 2,420 | 1,827–3,360 |
| Voids/l intake | 200 | 2.7 | 2.1–3.6 |
| Daytime urine vol (ml) | 170 | 1,110 | 1,110–2,117 |
| Nighttime urine vol (ml) | 150 | 390 | 0–137 |
| Daytime diuresis rate (ml/min) | 170 | 1.2 | 0.8–1.7 |
| Nighttime diuresis rate (ml/min) | 165 | 0.9 | 0.6–1.2 |
| I-PSS | 155 | 2 | 1–4 |

Key findings were the fact that subjects reported a median of 6 voids during 24 hours (range 2 to 21) with 95% voiding fewer than 12 times daily.

Table 3: Subject and diary variables significantly predictive of urinary QOL rating

| | Delighted | Pleased | Mostly Satisfied | Mixed- Unhappy |
|-----------------|------------|------------|------------------|----------------|
| No. subjects | 120 | 60 | 16 | 4 |
| Total I-PSS | 1 (0–11) | 2 (0–11) | 4 (0–22) | 10 (0–19) |
| Age | 28 (18–66) | 32 (18–65) | 40 (19–65) | 42 (24–55) |
| BMI | 24 (19–41) | 25 (19–42) | 28 (23–40) | 28 (23–34) |
| Voids/24 hrs | 6 (2–21) | 6 (3–12) | 6 (4–14) | 8 (5–14) |
| Nighttime voids | 0 (0–3) | 0 (0–1) | 0 (0–2) | 0.5 (0–3) |

Of the 200 men providing QOL ratings 120 (60%) were delighted, 60 (30%) were pleased, 16 were mostly satisfied, 4 were mixed unhappy. These 271 men had recorded a total of 261 I-PSS values with a median score of 2 (range 0 to 22), and with the distribution of I-PSS values within QOL categories as expected.

Discussion

A voiding frequency of more than 8 voids daily is commonly used to define abnormal urinary frequency. This value probably derives from a 1988 study of 151 asymptomatic Swedish women. [11] A recent study of voiding habits in 35 asymptomatic Japanese men showed a mean voiding frequency of 8 voids daily, [12] suggesting that the cutoff of 8 voids daily may be too low to define usefully a group with abnormal frequency. Similarly the recent study of Fitzgerald et al [13] showed that a sample of asymptomatic American women voided a median of 8 times daily.

A total of 200 asymptomatic males returned interpretable 24-hour diaries. Median age was 36 years (range 18 to 68). Subjects voided a median of 7 times in 24 hours (range 2 to 21) with 95% voiding fewer than 12 times daily. Median 24-hour urine volume was 1,650 ml (range 290 to 6,840). The results of our study and that of Homma et al [12] suggest that even in asymptomatic men a urinary frequency of more than 8 times daily is not uncommon and the use of 8 as the cutoff value to describe abnormal urinary frequency should probably be reconsidered. Our finding that urinary

frequency is related to total urine volume and total fluid intake, and inversely related to mean voided volume is intuitive and it reinforces the need to correct for fluid volumes in our descriptions of urinary frequency. It is also intuitive that a similar study done in a different climate or season might reveal different urinary habits, again suggesting that the use of a rigid cutoff value to describe abnormal frequency is inadvisable.

In studies of free voiding in pre-term and full-term infants we have noted interrupted voiding, that is 1 voiding divided into 2 or 3 parts within 10 minutes in 6013 and 20%, I4 respectively. This phenomenon was interpreted as a physiological form of dyscoordination due to immature voiding function. The pattern disappeared with increasing age, which suggests that it is associated with the degree of maturation of bladder function. [14] Key findings were the fact that subjects reported a median of 6 voids during 24 hours (range 2 to 21) with 95% voiding fewer than 12 times daily. Of the 200 men providing QOL ratings 120 (60%) were delighted, 60 (30%) were pleased, 16 were mostly satisfied, 4 were mixed unhappy. These 271 men had recorded a total of 261 I-PSS values with a median score of 2 (range 0 to 22), and with the distribution of I-PSS values within QOL categories as expected. Total I-PSS was found to be inversely related to total fluid intake. This finding may have been due to subjects with higher I-PSS scores limiting fluid intake to some degree or the finding may imply that lower fluid intake leads to fewer symptoms. The fact that I-PSS increases with age suggests that even in this

group of asymptomatic men there were changes in subjective urinary function with aging. Recruitment of a larger sample of older asymptomatic men would be necessary to explore this aspect fully. We found poor agreement between I-PSS item 6 (nocturic frequency) and the frequency of nocturia as recorded in the urinary diary. This result is in contrast to the findings of Blanker et al [15], who found a high correlation between answers to that I-PSS item and actual nocturic episode frequency. It is likely that our findings represent a limitation of a simple 24-hour record. A diary of longer duration may correlate more closely with I-PSS scoring.

Conclusion

Our results broadly agree with the sparse data from other countries suggesting that the use of a cutoff of 8 daily voids to define abnormal urinary frequency may not usefully discriminate between normal and abnormal urinary function. Furthermore, since urinary diary variables depend on patient characteristics, including age and are likely also to depend on climatic and social factors the application of a single set of normative values to all men is probably inadvisable.

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