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The Voiding Pattern In Asymptomatic Indian Men Between The Age Of 20 To 70 Years

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Abstract

Objective: To examine the potential clinical implications of the voiding position in asymptomatic Indian men.
Materials and methods: Men between the ages of 20 and 70 were included in our prospective research of men. The subjects were required to complete a 3-day voiding diary, and uroflowmetry was performed in accordance with our department's normal methodology.
Results: Qavg and Qmax were 17.5 and 28.7 mL/s on average. The typical V24 and F24 were respectively 1653.7 mL and 6.5. The biggest single voided volume ($r = 0.308$, $P = 0.002$), the smallest single voided volume ($r = 0.500$, $P = 0.001$), the daytime voided volume ($r = 0.378$, $P = 0.001$), the nighttime voided volume ($r = 0.533$, $P = 0.001$), and Vavg ($r = 0.704$, $P = 0.001$) were all positively correlated with the mean V24. PVR ($r = 0.415$, $P<0.001$), night time frequency ($r = 0.353$, $P<0.001$), and voiding frequency ($r = 0.345$, $P < 0.001$) were all strongly correlated with mean age.
Conclusion: The uroflowmetry parameters of elderly men are significantly influenced by the voiding position. It was discovered that voiding while sitting was ideal for elderly men, but it was impossible to tell what effect the voiding position had in healthy young men. To further understand this problem, more investigation is required.

Keywords: Flowmeter; Lower urinary tract symptoms; Posture; Prostate; Prostatic hyperplasia

Introduction

The upper tract, which is made up of the kidneys and ureters, and the lower tract are the two distinct yet interdependent portions of the urinary system. The lower tract is made up of the urethra and urine bladder.

The lower urinary system transforms the kidneys' automatic pee production into irregular, voluntarily controlled voiding. Understanding the lower urinary tract's anatomy, physiology, and regulation completely is essential [1, 2]

For the sake of description and instruction, the micturition cycle is best divided into two rather distinct phases: bladder filling/urine storage and bladder emptying/voiding. accommodating increased urine output while maintaining a comfortable sensation and minimal detrusor pressure (normal compliance). a bladder outlet that is closed when the body is at rest and remains so as the pressure inside the abdomen increases [3] There are no uncontrollable bladder contractions (detrusor overactivity). The following are necessary for voiding and bladder emptying: a sufficiently strong and prolonged synchronised contraction of the bladder smooth muscle. a simultaneous decrease in resistance at the striated and smooth sphincters (no functional obstruction). No anatomical obstruction exists.

A number of urinary symptoms known as LUTS are brought on by LUT dysfunction. Storage, voiding, and postmicturition are the three groups into which they are separated. Storage symptoms include urgency, increased frequency during the day, nocturia, incontinence, and altered bladder sensation. Some of the signs of voiding include hesitancy, intermittency, slow stream, and straining. Two post-micturition symptoms include the sensation of an incomplete emptying and dribbling.

Clinical reference values were developed in this study using bladder diary measurements from asymptomatic adult men between the ages of 20 and 70. We focused on the metrics 24-hour voiding frequency (F24), daylight frequency (D), nighttime frequency (N), 24-hour voided volume (V24), maximum (Vmax), minimum (Vmin), average volume per void (Vavg), maximum (Qmax), and average flow rate (Qavg).

The creation of therapeutically meaningful reference bladder diary values was the main objective of this investigation. At least as significant as the impact of age on F24 and V24 is the influence of V24 on F24 and Vol/Void. Reference voided volume values should be increased upward as V24 increases, according to prior research demonstrating that Vavg and Vmax rise in asymptomatic individuals when V24 rises. [1] Therefore, when establishing reference voiding diary data, we will use correlation analysis to characterise the relationships between void volume and F24 in the community of asymptomatic men and age and V24.

Methods

This is a prospective observational study done in the Department of Urology, Indira Gandhi Institute of Medical Sciences, Patna. The number of samples taken was 100 and the duration of the study was January 2020 to June 2021. The data source was Healthy asymptomatic Indian males between the age of 20 to 70 years who were attendants of patients admitted to the department of urology of IGIMS Hospital, Patna**.**

Method of data collection: All patients were assessed in accordance with a proforma that included their full medical history as well as information on their age, sex, weight, BSA, BMI, three-day bladder diary, and uroflowmetry.

The institutional ethics committee gave its approval to the study protocol. Before taking part in the trial, each subject supplied written informed consent. The study was carried out in compliance with the authorised protocol, the principles outlined in the Declaration of Helsinki, and the International Conference of Harmonization's Good Clinical Practice guidelines.

INCLUSION CRITERIA

Asymptomatic males of age 20 to 70 years.

EXCLUSION CRITERIA:

1. Patient with LUTS.
2. Neurological disease and psychological disorders.
3. Diabetes
4. CKD
5. Patient taking drugs that influence lower urinary tract

Methodology

The Urology department's ward served as the site of this prospective investigation. The Institutional Review Board and Ethics Committee both gave their approval to the study's methodology and design. The study's purpose has been described to every participant, and their informed consent was gained in their original language. Male adults between the ages of 20 and 70 who were asymptomatic and were accompanying patients who had been hospitalised to the urology ward were recruited. Before being enrolled in the study, participants were thoroughly questioned about their past health, employment, and drug use. This was followed by a clinical examination that included a general physical examination of the subjects' weight, height, abdominal area, external genitalia, chest, CNS, DRE, and focused neurological examination. Subjects were asked to fill a 3-day voiding diary and Uroflowmetry was carried as per our standard protocol of department. Uroflowmetry parameters including Peak/maximum flow rate (Qmax), average flow rate (Qavg), time to peak flow rate (TQmax), voided volume (VV) and total voiding time (VT) were noted. Corrected Qmax and Qavg were calculated as (a) Corrected Qmax = Qmax/2$\sqrt{VV}$, (b) Corrected Qavg = Qavg/2$\sqrt{VV}$

Statistical Analysis:

SPSS version 22 was used for the statistical analysis. Quantitative data were presented as mean, whilst qualitative data were provided as numbers and percentages (standard deviation [SD]). The Shapiro-Wilk test was used to determine whether quantitative data had a normal distribution. An independent t-test (for normal distribution) and Mann-Whitney test (for non-parametric data) were used to compare quantitative variables between two groups. The Spearman correlation coefficient was employed in correlation analysis for skewed distribution variables and the Pearson correlation coefficient for those with a normal distribution. Statistical significance was defined as $P < 0.05$.

RESULTS

A total of 100 asymptomatic men who completed 72-hour diaries were included in this study.

Table 1. Sub-group analysis of age; Qmax; Qavg; voided volume; PVR; day-time and night-time voided volume per void; 24 hours voided volume; and daytime and night-time frequency

Age		
Parameter	**N**	**Mean age ±SD**
Age (years), mean (SD)	**100**	40.2 ±14.6
20-30	34	24.735± 2.926
31-40	23	36.174 ± 2.622
41-50	15	45.733 ± 3.127
51-60	14	55.214 ± 2.392
61-70	13	65.308 ± 2.394
Qmax		
20-30	34	31.853 ± 13.015
31-40	23	27.783 ± 8.442
41-50	15	32.267 ± 9.903
51-60	14	23.429 ± 8.299
61-70	13	23.385 ± 8.272
Qavg		
20-30	34	19.588 ±7.241
31-40	23	18.391 ±4.979
41-50	15	18.800± 6.109
51-60	14	13.571 ±4.988
61-70	13	13.538 ±5.441
Voided Volume		
20-30	34	460.294 ± 205.566
31-40	23	396.087 ± 215.549
41-50	15	466.000 ± 187.723
51-60	14	392.143 ± 149.057
61-70	13	355.385 ± 187.288
PVR		
20-30	34	2.941 ± 6.291
31-40	23	3.913 ±8.388
41-50	15	6.000 ± 9.103

51-60	14	14.643 ± 9.700
61-70	13	11.923 ±11.094
Day-time voided volume per void		
20-30	34	282.088 ±59.117
31-40	23	271.478 ±41.840
41-50	15	259.733± 47.581
51-60	14	258.143 ±67.068
61-70	13	264.385 ±56.600
Night-time voided volume per void		
20-30	34	329.265 ±54.918
31-40	23	295.783± 83.015
41-50	15	316.000 ±47.885
51-60	14	309.714± 63.884
61-70	13	324.769 ±45.624
24 hours voided volume		
20-30	34	1607.824 ± 249.795
31-40	23	1624.304 ± 253.368
41-50	15	1689.200 ± 219.889
51-60	14	1629.429 ± 284.290
61-70	13	1811.077± 212.577
Daytime frequency		
20-30	34	4.941 ± 0.736
31-40	23	5.000± 0.522
41-50	15	5.067 ±0.594
51-60	14	5.571± 0.938
61-70	13	5.231 ±0.725
Night-time frequency		
20-30	34	1.118 ± 0.056
31-40	23	1.435 ± 0.123
41-50	15	1.467 ± 0.133
51-60	14	1.643 ± 0.133
61-70	13	1.615 ± 0.180

Age: In the current study, the patient's mean age (mean ±SD) is 40.2±14.6. In the subgroup analysis, 34 patients at the highest reported age range (20-30 years) and 13 patients at the lowest reported age range (61-70 years).

Qmax: According to age-specific subgroup analysis, Qmax was shown to be greater in the 20–30 age group (31.853 ±13.015). In the age groups of 51 to 60 years old (23.429 ± 8.299) and 61 to 70 years old (23.385 ± 8.272), Qmax dramatically declined. The lowering Qmax with increasing age is statistically significant (p=0.02).

Qavg: As people aged, the Qavg considerably dropped (p=0.003). Lower Qavg found in age groups 51-60 year (23.429 ± 8.299) and 61-70 year (23.385 ± 8.272). Higher Qavg reported in age group of 20-30 year (31.853 ± 13.015).

Voided volume: The mean voided volume decreased as age increased, although there was no statistically significant difference (p=0.3). Age groups 20 to 30 are reported to have higher mean voided volumes, but age groups 51 to 60 (392.143 ± 149.057) and 61 to 70 (355.385 ±187.288) are said to have lower mean voided volumes.

PVR: Post void residual volume increased significantly as age progressed ($p < 0.0001$). It increased significantly in the age group of 40-50 year (6.000 ± 9.103), 51-60 year (14.643 ± 9.700) and 61-70 year (11.923 ±11.094).

Day-time and Night-time voided volume per void: There was no discernible difference between the age groups for either the daytime or nighttime voided volume per void (p=0.5 and 0.3, respectively). As people age, their mean daily and nightly voided volume per void stays constant.

24 hours voided volume: No significant difference was seen in the mean 24-hour volume of faeces among the age groups on subgroup analysis (p=0.13). Mean 24 hours voided remained constant as people aged.

Daytime and night-time frequency: Day time frequency and night-time frequency increased significantly as age progressed (p= 0.0075, 0.0033 respectively). Day-time frequency increased from 4.941 ± 0.736 in age group of 20-30 year to 5.571± 0.938 in age group of 51-60 year.

DISCUSSION

We selected participants who denied having any voiding complaints in order to create a frame of reference for Indian male patients with voiding complaints. In comparison to a community-based screening population that would include participants with such complaints, this sample of volunteers was different. Numerous studies have already documented asymptomatic subjects' bladder diary variables. Despite the fact that the majority of the statistics come from the western population. The mean and median values of V24 from the current study population are generally consistent with findings from prior studies using bladder diary recordings from

healthy subjects. The mean V_{24} in the present study was 1653.7 mL. Similar findings were observed in studies done by Blanker et al [5] Latini et al [4] Tisoot et al [1] which reported mean V_{24} of 1506 mL, 1650 mL, and 1713 mL, respectively . Homma et al.'s [15] mean V24 is less than the V24 means obtained by all other investigators. The fact that Homma's study sample was hospitalised, where drinking of, for example, alcoholic beverages would be prohibited, as opposed to a population living at home, may be the cause of this discrepancy. The results of Holiloglu et al.'s[10] study differed somewhat from those of other research mentioned in the literature. In a 24-hour period, the mean V24 was 1256 mL. Observation research that was recently published assessed the average bladder diary readings in asymptomatic pregnant women. In this study, asymptomatic non-pregnant women had a mean V24 that was lower. Additionally, pregnancy causes a decrease in 24-hour urine production.

The mean and median values of F24 from the population of the current study are generally consistent with findings from prior studies using bladder diary recordings from asymptomatic people. In the current study, the mean F24 was 6.5. Studies conducted by Blanker et al. [5], Latini et al. [4], van Haarst et al. [11], and Tissot et al. [1] revealed similar results, reporting mean F24 of 6.1, 7.0, 7.1, and 6.6, respectively. Some normative investigations have revealed a greater limit of normal for F24 than is frequently used clinically, while employing a more strict definition of "asymptomatic." The reported mean F24 by Homma et al. [9] and Fitzgerald et al. [12] is marginally greater than the F24 values attained by all other investigators (8 and 8.3, respectively). Additionally, the frequency of urination may only annoy you when the quantity of voids is too high. The F24 count peaked at 9.0. Eight voids per 24 hours is a standard selection criterion for overactive bladder in clinical trials. However, the frequency of voiding rises with age, and in senior people, a frequency of more than 8 could be considered usual.

The reference urine output levels given in the study had 95 percent confidence limits that were consistent with earlier findings. The average volume and frequency of voiding during the day and night in the current study were comparable to those in earlier investigations. The 95% nighttime frequency confidence limits appeared to be lower than Homma et al [9]. .'s Additionally, 24-hour volume percentages during the nighttime seem to be a little lower than those stated by Homma et al[35].

When analysing bladder diaries clinically, it may be necessary to take into account the relationship between V24 and FBC. A lower FBC in a patient with a large V24 can be disregarded if the FBCs of patients with urge incontinence (UI) or urodynamically demonstrated detrusor overactivity (DO) also increase with increasing V24. In contrast, a healthy woman with a small V24 may receive a false positive FBC diagnosis. When reference values are taken into account for their age and V24 correlations, the F24 and FBC reference ranges' variability is decreased by about 20% and 50%, respectively. The bladder diary's sensitivity to detecting lower FBC and higher frequency may be enhanced by this reduction in reference value variability.

In the current study, PVR, nighttime frequency, and voiding frequency all showed favourable correlations with average age. These findings suggest that the PVR, nighttime frequency, and voiding frequency all tended to rise with age. According to Amundsen et al. [14], functional bladder capacity declined marginally with age while F24 increased dramatically.

CONCLUSION

In order to create clinical reference values, 100 asymptomatic men were included in the study, with the majority falling within the age range of >30-60 years. Participants underwent evaluations for bladder diary frequency and volume measurements. The investigation lasted for 18 months.

100 men (median age: 40.2 years), who were classified as "asymptomatic," provided computer-processed three-day bladder diaries. Qavg and Qmax were 17.5 and 28.7 mL/s on average. The typical V24 and F24 were respectively 1653.7 mL and 6.5. The biggest single voided volume ($r = 0.308$, $P = 0.002$), the smallest single voided volume ($r = 0.500$, $P = 0.001$), the daytime voided volume ($r = 0.378$, $P = 0.001$), the nighttime voided volume ($r = 0.533$, $P = 0.001$), and Vavg ($r = 0.704$, $P = 0.001$) were all positively correlated with the mean V24. PVR ($r = 0.415$, $P<0.001$), nighttime frequency ($r = 0.353$, $P<0.001$), and voiding frequency ($r = 0.345$, $P<0.001$) were all strongly correlated with mean age.

The current research, which is corroborated by a number of others, shows that age and V24 significantly affect void volume, daytime volume, nighttime volume, lowest single volume, greatest single volume, and PVR measures from asymptomatic individuals. Therefore, the reference values should be modified to account for the known impacts of age and V24 within the reference population when comparing a patient's bladder diary measurement to the reference population.

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