

Use of a Voiding Dairy in the Evaluation of Overactive Bladder and Nocturia

Chung-Cheng Wang, M.D.^{1,2}, Jen-Jih Chen, M.D.¹, Chung-Hsin Peng, M.D.¹, Chien-Hsun Huang, M.D.¹,
Chiung-Lang Wang, M.D.³

Department of Urology¹, En Chu Kong Hospital and College of Medicine, National Taiwan University, Taipei, Taiwan; Department of Biomedical Engineering², Chung Yuan Christian University, Taoyuan, Taiwan; Department of Gynecology and Obstetrics³, Taipei Hospital, Department of Health, Taipei, Taiwan

VOIDING DIARY

A voiding diary is a record in which patients write down micturition and symptoms for a period of days. It is an indispensable instrument to document the nature and severity of lower urinary tract dysfunction and incontinence. The recording of micturition events can be in three main forms:

- **Micturition time chart** records only the times of micturition, day and night, for at least 24 hours.
- **Frequency volume chart** records the volume voided and the time of each micturition, day and night, for at least 24 hours.
- **Bladder diary** records the times of micturition and voided volume, incontinence episodes, pad usage and other information such as fluid intake, the degree of urgency and the degree of incontinence.

Physicians and health givers can choose an appropriate voiding diary for both the assessment and treatment of bladder dysfunction. A frequency volume chart may be enough for patients who complain of frequency and nocturia but do not have incontinence or urgency. A detailed bladder diary can offer more information than the other two types of micturition records. However, decreased patient compliance has been reported when test durations are increased to 48 and 72 hours [1]. In addition, we usually ask patients having a cystostomy under bladder training to record the post-voiding residual urine, which is important but not included in the conventional voiding diary.

A standard paper chart and a container to measure the urine volume are necessities for patients to record a voiding diary. Excel® software can be used to make a chart for use as a diary (Fig. 1). We used empty intravenous 500 mL normal saline bottles as containers to record the volume of voided urine (Fig. 2). We marked the volume amounts from 50 mL to 500 mL on the side of the bottles. These designs are cheap, environment-protecting and user-friendly.

OVERACTIVE BLADDER

Overactive bladder (OAB) is characterized by symptoms of frequency (8 or more voids per day) and urgency (a strong and sudden desire to void) with or without urge incontinence. However, most epidemiological studies of OAB failed to quantify urgency or episodes of

urge incontinence, which is the core symptom of OAB. In 2005, using records from voiding diaries, Zinner et al proposed a quantitative measurement of OAB, the overactive bladder symptom composite score (OAB-SCS) [2]. Every toilet void was patient rated for urgency severity as follows: 1-none (no urgency), 2-mild (awareness of urgency but it was easily tolerated and the patient could continue with usual activities or tasks), 3-moderate (enough urgency discomfort that it interfered with or shortened usual patient activities or tasks), 4-severe (extreme urgency discomfort that abruptly stopped all activities or tasks) and 5-urge urinary incontinence.

The calculation of OAB-SCS is the sum of the severity of urgency multiplied by the number of voiding episodes. The Table shows an example of a patient with a total of 9 toilet voids on a given day, including 3 voids given an urgency severity score of 1, 2 voids given a score of 3, 4 voids given a score of 4 and 2 urge urinary incontinence episodes not associated with a toilet void, for a daily OAB-SCS total of 35.

The math may seem too complex for health providers. A portable electronic diary may be a superior solution. Quinn et al reported that 94% of patients found the electronic diary easy to use and it provided real-time data which could be analyzed rapidly [3]. In the near future, we hope to create a Chinese-version electronic bladder diary that is suitable and helpful for patients in Taiwan.

NOCTURIA

The International Continence Society definition of nocturia is the condition of waking up to void one or more times during the night [4]. Nocturia is a common reason for urological consultation [5]. Elderly patients with nocturia are likely to suffer from serious health risks due to sleep deprivation. In one study, the chance of traumatic injury through falling increased from 10% to 21% with 2 or more voids per night [6]. Insufficient and disrupted sleep has commonly been associated with physical and mental disorders, particularly depression and mood alternation.

According to voiding diaries, the causes of nocturia have been divided into the following four main categories: (1) nocturnal polyuria, (2) decreased nocturnal bladder capacity (low NBC), (3) mixed, a combination of the previous two conditions, (4) global polyuria [7]. Nocturnal polyuria refers to overproduction of urine during sleep hours. The formula for calculating the nocturnal polyuria index (NPI) is the nocturnal urine volume divided by the 24-hour urine volume. It should be noted that the nocturnal urine volume excludes the last void before sleep but includes the first void of the morning [Abrams 2003]. An NPI

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Address correspondence to: Dr. Chiung-Lang Wang, Department of Gynecology and Obstetrics, Taipei Hospital, Department of Health, 127, Su-Yuan Road, Hsin-Chuang city, Taipei, 24213, Taiwan

E-mail: depu00460@ptph.doh.gov.tw

greater than 35% in the elderly and greater than 20% in younger patients is indicative of nocturnal polyuria. Another precise definition of nocturnal polyuria takes the exact number of hours asleep into consideration. Nocturia polyuria is defined as a nocturnal urine volume > (Number of hours sleep ÷ 24) × 24 hour urine volume.

A decreased NBC can be related to a decreased MVV (the largest volume of urine voided during a single micturition determined from a voiding diary) or a decreased NBC (the largest voided volume during the hours of sleep). The NBC index is the actual number of nightly voids minus the predicted number of nightly voids, which is defined as (nocturnal urine volume ÷ MVV) - 1. A decreased NBC is defined as an NBC index greater than 0. A high NBC index indicates a diminished NBC or more severe sensory urgency.

Mixed nocturia is a combination of nocturnal polyuria and a decreased NBC. Global polyuria is defined as a 24-hour urine output of more than 40 mg/kg. Polyuria is related to increased intake, so polyuria and

polydipsia are closely related. Polyuria is easily calculated from the voiding diary. For example, in a person weighing 60 kg, an output of more than 2400 mL urine in one day is global polyuria.

VOIDING DIARY CONTROVERSIES

There is no consensus on the number of days a voiding diary should be recorded. It has been suggested that recording for 3 days increases reliability but this is associated with decreased patient compliance compared with recording for just 1 day [1]. Recording for 2 days during the weekend may be a practical choice in Taiwan. However, this record does not truly reflect the bladder condition during working hours in these patients.

Another controversial issue concerns what a clinician should believe - a patient's recall or the urinary diary. Although the voiding diary is among the best possible means of obtaining objective data on subjective symptoms, it is unknown whether it reflects actual urinary habits. Wyman et al found

only 50% agreement between the patient history and the diary in patients with urge incontinence [8]. The discrepancy between patient recall and the diary may be due to patients overestimating/underestimating their urinary habits or poor diary compliance. However, despite the lack of data supporting the precision of urinary diaries, they continue to be used as the main outcome measures in clinical incontinence studies.

CONCLUSIONS

A voiding diary is helpful in the evaluation of patients with bladder symptoms and in treatment follow-up. It can also provide a simple form of bladder retraining. Although a voiding diary may sometimes be unreliable because voiding habits and patient compliance may vary, it is recommended as a first-

Please record the times and amounts of oral intake, voided volume, degree of urgency and urine leakage. Use one sheet per day

Time	Oral Intake	Voided Urine	Urgency	Urine Leakage
Go to bed				
Wake up				

Fig. 1. Illustration of a bladder diary.

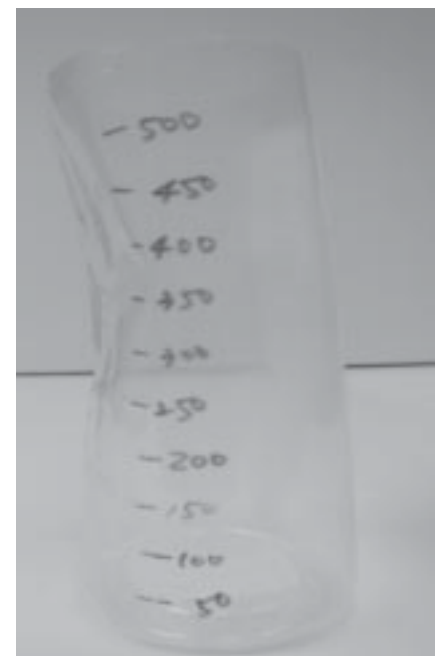


Fig. 2. An empty 500 mL normal saline bottle can be made into a container to record the urine volume.

Table 1. Examples of OAB-SCS total for patient reported toilet voids and urge urinary incontinence events during one day of diary collection

	Severity of Urgency	Severity points × No. Events
No. toilet void events:		
3	1	3 × 1= 3
2	3	2 × 3= 3
4	4	4 × 4=16
2 urge incontinence episodes	5	2 × 5=10
OAB--SCS total		35

line method for diagnosing and/or treating patients with OAB and nocturia.

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