

## BLADDER DIARY CORRELATIONS WITH URODYNAMICS IN WOMEN WITH OVERACTIVE BLADDER

### Hypothesis / aims of study

The cardinal symptom of OAB is urinary urgency. Due to its subjective nature this sensory phenomenon is difficult to assess. Validated questionnaires have been developed to assess urgency, although these are rarely used in pharmaceutical trials. Sensation related bladder diaries have been recommended to quantify the frequency and voided volumes and the associated degree of urgency to urinate (1). As well, urodynamics testing (UDS) can be used to assess bladder sensation with increasing filling volumes although there is some concern that bladder sensation on UDS may be overstated secondary to the presence of a urethral catheter or unphysiologic filling rates (2). The purpose of this study is to determine if any correlation exists between bladder sensation as measured by bladder diary versus UDS in women with OAB. The effect of urodynamically proven DO on these relations is also explored.

### Study design, materials and methods

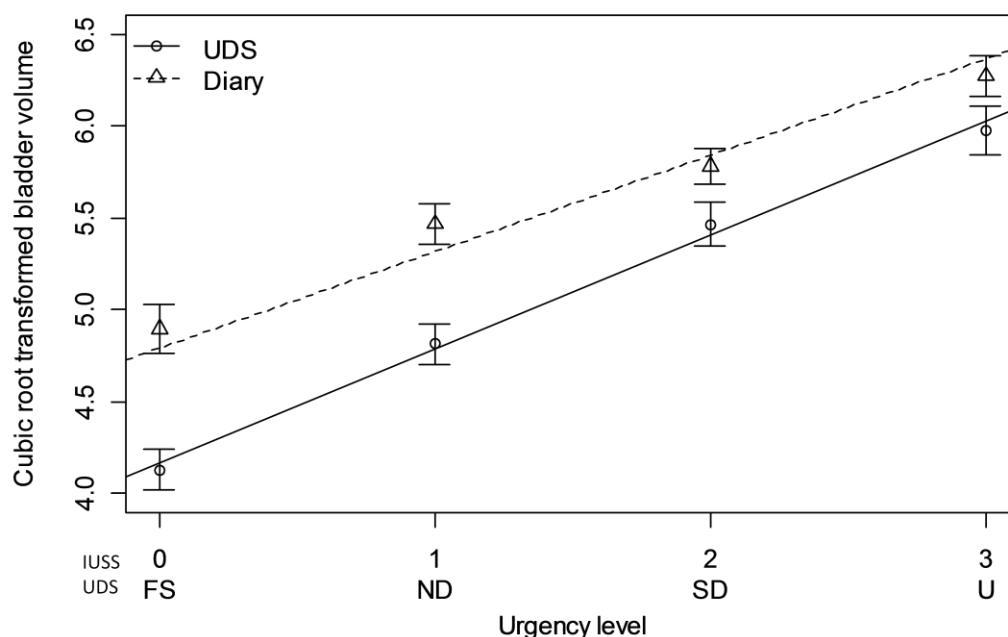
A retrospective chart review was performed on 146 women with OAB. Exclusion criteria included overt neurological condition (e.g. multiple sclerosis, stroke, spinal cord pathology) or other condition that could affect sensation (e.g. diabetes), pure stress incontinence or incomplete data. None had greater than stage 2 vaginal prolapse (beyond hymenal ring), post-void residual urine volume greater than 100mL or abnormal bladder compliance. All patients completed a 48 hour bladder diary documenting voided volumes and degree of urgency to void using the Indevus Urgency Severity Scale, IUSS (0- no urgency, 1- awareness of urgency, but is easily tolerated and you can continue with your usual activity or tasks, 2- enough urgency discomfort that it interferes with or shortens your usual activity or tasks, 3- extreme urgency discomfort that abruptly stops all activity or tasks). Average voided volumes were calculated for each IUSS grade. All patients underwent multichannel UDS with documentation of the volumes for each sensory marker (first sensation of filling, FS; normal desire to void, ND; strong desire to void, SD; and urgency, U) as well as the presence or absence of detrusor overactivity (DO). Correlations between the average volumes for each grade of IUSS on bladder diary and UDS sensory marker volumes were then determined using Spearman's correlation coefficient, and a GEE repeated measures model predicting bladder size (cubic root of the volume to improve linearity and normality) from urge score was fitted. The effect of urodynamically proven detrusor overactivity on these relations was also explored.

### Results

Pairwise correlations showed that all measurements were correlated. A greater correlation was noted within measurements on UDS than on diary.

IUSS grade	Mean voided volume (mL)	SD	UDS sensory marker	Mean infused volume (mL)	SD	Spearman coefficient
0	138.1	91.2	FS	94.1	103.0	0.35
1	185.8	114.2	ND	137.8	118.4	0.42
2	216.5	126.6	SD	197.7	147.3	0.46
3	273.8	163.1	U	257.5	182.2	0.50

## Relationship between urgency level and bladder size



The slopes of both the diary and UDS curves are significantly different from 0 ( $p < 0.0001$ ). The difference between diary and UDS slopes is not statistically significant ( $p = 0.073$ ). At each corresponding urge level, the bladder size is statistically significantly larger on diary than on UDS (all  $p < 0.03$ ).

When reanalyzed to compare patients with and without DO: the slopes of both diary and UDS curves are lower in patients with DO ( $p < 0.0001$ ). The differences between diary slope vs. UDS slope is statistically similar for DO and No-DO patients ( $p = 0.08$ ). The differences noted between IUSS bladder size and UDS sensation bladder size are only significant in patients with DO (all  $p < 0.001$ ).

### Interpretation of results

Moderate correlations exist between IUSS volumes on bladder diary and sensory marker volumes on UDS in women with OAB. Using both instruments, higher urgency levels are positively associated with increased bladder size. However, bladder size is significantly smaller for corresponding UDS sensations than for diary/IUSS suggesting a weak clinical relationship. This appears to be mainly related to the presence of DO. There appears to be a closer agreement between IUSS and UDS in patients without DO. In OAB patients with urodynamically proven DO, the bladder appears hypersensitive on UDS relative to diary/IUSS. Therefore, using UDS volumes to gauge bladder sensation may overcall bladder sensitivity and underestimate bladder capacities, particularly in patients with DO.

### Concluding message

While moderate correlations are found between bladder diary/IUSS volumes and UDS sensation volumes, the clinical relationship appears weak, particularly in patients with demonstrable DO. Using UDS sensation volumes to gauge bladder sensation and capacity may overcall bladder sensitivity and underestimate bladder capacity.

### References

1. Naoemova I, De Wachter S, Wuyts FL, Wyndaele JJ. Reliability of the 24-h sensation-related bladder diary in women with urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct* 2008;19(7): 955-959
2. Erdem E, Akbay E, Doruk E, Cayan S, Acar D, Ulusoy E. How reliable are bladder perceptions during cystometry? *Neurourol Urodyn* 2004;23(4): 306-309

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<b>What were the subjects in the study?</b>	<b>HUMAN</b>
<b>Was this study approved by an ethics committee?</b>	<b>Yes</b>
<b>Specify Name of Ethics Committee</b>	<b>Medical College of Wisconsin/Froedtert Hospital Institutional Review Board</b>
<b>Was the Declaration of Helsinki followed?</b>	<b>Yes</b>
<b>Was informed consent obtained from the patients?</b>	<b>No</b>