

## DOES AN ELECTRONIC BLADDER DIARY READER IN COMBINATION WITH BLADDER WALL THICKNESS CAPTURE SYMPTOMS RELEVANT TO QUALITY OF LIFE IN WOMEN WITH PELVIC FLOOR DYSFUNCTION?

### Hypothesis / aims of study

Quality of life questionnaires (QoL) provide a reliable method of assessing the impact of urinary incontinence in women [1]. We tested the performance of an electronic bladder diary reader, and correlated quality of life impairment with the results. We also investigated whether a relationship exists between bladder wall thickness (BWT) and diary variables, in view of the association between BWT and detrusor overactivity (DO) [2].

### Study design, materials and methods

Women with troublesome lower urinary tract symptoms, who had completed a frequency-volume chart (FVC) and a validated disease-specific quality of life questionnaire (King's Health Questionnaire, KHQ), agreed to participate in the study. An electronic diary reader (Life-Tech, Inc., Texas, U.S.A.), was used to collate the bladder diary variables; all women subsequently underwent assessment in our one-stop clinic, consisting of history, examination, transvaginal ultrasound measurement of mean BWT [trigone, anterior wall, and dome; volume less than 50mls; Sonosite portable ultrasound machine with a 7.4MHz transvaginal probe], uroflowmetry, and subtracted videocystometry, adherent with ICS, using a Laborie Aquarius 120 machine. BWT and diary variables were compared within diagnostic groups using a Mann Whitney test for non-parametric data (SPSS, v12), depending on whether the mean BWT was  $< / \geq 5$ mm, as BWT  $\geq 5$ mm is suggestive of DO. KHQ data were compared using the Pearson correlation coefficient. Missing data were excluded from the domain calculation; correctly completed domains were included. Participants also answered a questionnaire, graded from 1 (very easy) to 5 (very hard) on a Likert scale, about the diary instruction sheet and completion of the bladder diary. Consent was obtained and ethics approval was granted.

### Results

We recruited 194 symptomatic women to the study. Subsequently, 26 were excluded from the data analysis because of inadequate completion of at least one part of the study. Data were available for analysis in 168 women (mean age 52 years). 31 (18.5%) had DO; 33 (19.6%) had overactive bladder symptoms (OAB); 48 (28.6%) had urodynamic stress incontinence (USI); 21 (12.5%) had mixed incontinence (MI); 15 (8.9%) had a normal study as part of a prolapse work-up; the remainder had sensory urgency, painful bladder syndromes, or voiding difficulty, either alone or in combination with other diagnoses.

A total of 141 women had data available for analysis of bladder wall thickness and diary variables, with results set out in table 1.

**Table 1.** A comparison of bladder diary variables if bladder wall thickness is  $\geq / <$  5mm. Asymptotic significances of the differences, for major diagnoses, are given (Mann Whitney test). *Vol 24hr* = total volume of urine in 24 hours; *Day freq* = diurnal frequency; *Night freq* = nocturnal frequency; *IEF* = Incontinence episode frequency

▽	N=	Vol 24hr	Day freq	Night freq	24 hour urine prod (ml/min)	Mean void volume (mls)	Max void volume (mls)	IEF
<b>DO</b>	$\geq 5$ mm: 14	0.896	0.163	0.359	0.861	0.295	0.212	0.272
	$< 5$ mm: 15							
<b>Mixed</b>	$\geq 5$ mm: 7	0.322	0.905	0.017	0.322	0.843	0.283	0.194
	$< 5$ mm: 13							
<b>NUDS</b>	$\geq 5$ mm: 5	0.713	0.903	0.805	0.713	0.462	0.902	0.136
	$< 5$ mm: 10							
<b>OAB</b>	$\geq 5$ mm: 5	1	0.452	0.078	0.957	0.519	0.665	0.933
	$< 5$ mm: 26							
<b>USI</b>	$\geq 5$ mm: 11	0.787	0.728	0.169	0.767	0.511	0.056	0.905
	$< 5$ mm: 35							

A total of 127 women completed the King's Health Questionnaire adequately for inclusion in the analysis of diary variables and QoL, with Pearson correlation coefficients and significances set out in table 2. The Likert scale assessment was completed by 149 women, of whom 79.1% found the instructions 'very easy' or 'easy' to understand; 19.4% found them 'about average' and 1.3% found them 'hard' or 'very hard' to understand. The diary was found to be 'very easy' or 'easy' to complete by 84.3% of respondents - 11.6% found it 'about average' and 2.2% found it 'hard'.

**Table 2.** Correlation of bladder diary variables with quality of life assessment. *GHP=General Health Perceptions; II=Incontinence Impact; RL=Role Limitations; PL=Physical Limitations; SL=Social Limitations; PR= Personal Relationships; E=Emotions; SE=sleep/Energy; SM=Severity Measures*

Domain		Day freq	Night freq	Mean void vol	Max void vol	IEF	Leak size
<b>GHP</b>	Pearson	-0.046	0.200	0.032	0.023	0.112	0.138
	Sig	0.608	<b>0.024</b>	0.719	0.801	0.208	0.122
	n=	127	127	127	127	127	127
<b>II</b>	Pearson	0.253	0.085	-0.137	-0.213	0.253	0.134
	Sig	<b>0.004</b>	0.342	0.123	<b>0.016</b>	<b>0.004</b>	0.133
	n=	127	127	127	127	127	127
<b>RL</b>	Pearson	0.322	0.194	-0.184	-0.135	0.294	0.035
	Sig	<b>0.0001</b>	<b>0.032</b>	<b>0.042</b>	0.137	<b>0.001</b>	0.701
	n=	123	123	123	123	123	123
<b>PL</b>	Pearson	0.225	0.109	-0.100	-0.062	0.256	0.153
	Sig	<b>0.012</b>	0.231	0.272	0.494	<b>0.004</b>	0.091
	n=	123	123	123	123	123	123
<b>SL</b>	Pearson	0.266	0.155	-0.185	-0.168	0.285	0.042
	Sig	<b>0.003</b>	0.087	<b>0.041</b>	0.063	<b>0.001</b>	0.648
	n=	123	123	123	123	123	123
<b>PR</b>	Pearson	0.05	-0.067	-0.174	-0.179	0.152	0.071
	Sig	0.655	0.553	0.121	0.110	0.175	0.530
	n=	81	81	81	81	81	81
<b>E</b>	Pearson	0.159	0.120	-0.104	-0.212	0.295	0.269
	Sig	0.077	0.185	0.250	<b>0.018</b>	<b>0.001</b>	<b>0.003</b>
	n=	124	124	124	124	124	124
<b>SE</b>	Pearson	0.280	0.337	-0.245	-0.249	0.064	0.071
	Sig	<b>0.002</b>	<b>0.0001</b>	<b>0.007</b>	<b>0.006</b>	0.488	0.443
	n=	120	120	120	120	120	120
<b>SM</b>	Pearson	0.114	0.069	-0.084	-0.012	0.321	0.412
	Sig	0.217	0.453	0.360	0.892	<b>0.0001</b>	<b>0.0001</b>
	n=	120	120	120	120	120	120

#### Interpretation of results

The instructions and diary were well received by women referred to a one-stop urodynamic assessment clinic. The diary variables had moderate but significant correlation across a broad number of domains, with daytime frequency and incontinence episode frequency performing best. Night time events, and objective measurements of volumes voided and leak episode size, may be less reliably recorded than a simple diary of event occurrence. 'Personal relationships' domain did not perform well - a large number of women were excluded from that domain because they were not sexually active.

#### Concluding message

Although bladder wall thickness is a useful part of the clinical assessment of a woman with troublesome lower urinary tract symptoms, it does not appear to explain the difference in bladder diary variables seen in some bladder conditions. The electronic diary reader was well received and understood by the women participating in our study. There was moderate and broad correlation between the major bladder diary variables and quality of life domains.

1. A new questionnaire to assess the quality of life of urinary incontinent women. *Br J Obstet Gynaecol* 1997;104:1374-1379
2. Ultrasound: a non-invasive screening test for detrusor instability. *BJOG* 1996; 103(9):904-8

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