Clinically useful measures in women with mixed urinary incontinence

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OBJECTIVE: The purposes of this study were to assess: 1) clinically relevant relationships between urinary diary and quality of life, and 2) reproducibility of validated questionnaires and urinary diaries in women with mixed urinary incontinence symptoms (MUI).

STUDY DESIGN: Forty-seven women with MUI completed 7-day diaries, the Urinary Distress Inventory (UDI-6), Incontinence Impact Questionnaire, and Medical, Epidemiological, and Social Aspects of Aging questionnaire 2 weeks apart.

RESULTS: The number of urge incontinence episodes predicted incontinence severity on UDI-6 ($R^2 = .38$, $P < .03$). Except for the number of stress incontinence episodes, diary variables and questionnaire responses were reproducible (range from Spearman's $\rho = .7$ to $\rho = .96$, $P < .001$).

CONCLUSION: The 6 questions of the UDI-6 adequately represent incontinence severity. With the exception of the number of stress incontinence episodes recorded on the 7-day diary, common incontinence measures are reproducible over 2 weeks.

Key words: diary, mixed incontinence, quality of life, stress incontinence, urge incontinence

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Voiding diary variables are commonly used to objectively measure lower urinary tract functions including urinary frequency, incontinence episode frequency, and voided volumes. Diaries are also used to determine the incontinence subtype, incontinence severity, and to direct treatment decisions. However, diaries are burdensome to patient and clinicians alike.

Furthermore, investigators have reported poor correlation between symptoms and objective measures of incontinence in women with MUI using urodynamic diagnoses.[1] In women with urge incontinence, there is poor correlation between incontinence episode frequency and immediate postdiary recall, likely due to overreporting or underrecording.[2] This lack of correlation was more pronounced in women who reported more bother from incontinence symptoms as measured by validated condition specific quality-of-life (QOL) questionnaires.[2]

There is increasing focus on a patient-centered approach to medical care, especially in quality-of-life disorders such as urinary incontinence. There is uncertainty as to the optimal treatment plan for women with MUI, as clinicians must recommend primary treatment of either urge or stress incontinence, leaving the other component untreated. Therefore, we sought to determine the relationship of common urinary diary variables to condition-specific bother and QOL in women with MUI. Most clinical assessments have not been tested for stability over short periods of time in the absence of treatment. Therefore, we also wanted to determine the reproducibility of study measures, including variables from consecutive 7-day urinary diaries and the questionnaires.

Materials and Methods

Participants with MUI were recruited for this prospective institutional review board (IRB) approved study from our tertiary care referral practice and with informational brochures. The clinical diagnosis of MUI was verified with documentation of at least 1 stress and 1 urge symptom on the baseline MESA. All participants completed a 7-day voiding diary for 2 consecutive weeks. The details of this study have been described earlier.[2] Briefly, diary variables included number and volume of voids per 24 hours and total number of urge and stress incontinence episodes per week. Subjects also completed short forms of 2 validated condition specific QOL questionnaires 2 weeks apart: Urinary Distress Inventory (UDI-6)[3] and Incontinence Impact Questionnaire (IIQ-7)[3]; and Medical, Epidemiological, and Social Aspects of Aging (MESA)[4] incontinence screening questionnaire. The IIQ-7 was developed to measure the impact of urinary incontinence on various activities, roles, and emotional states. The UDI-6 measures the amount of distress from incontinence symptoms. Responses to UDI-6 and IIQ-7 were scored from 0 to 100 according to standard scoring.[3] The mean value for all IIQ-7

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TABLE
Analysis of repeated measures

Repeated measures in 2 consecutive weeks	First week (mean ± SD)	Second week (mean ± SD)	Spearman's correlation ρ	*P* value[b]
Frequency of urination per 24 hours	8 ± 2	8 ± 2	ρ = .79[a]	.86
Voided volume per 24 hours	1154 ± 395	1183 ± 485	ρ = .69[a]	.82
UDI-6	45 ± 2	40 ± 2	ρ = .86[a]	.12
IIQ7	35 ± 3	35 ± 3	ρ = .96[a]	1
MESA-stress	13 ± 7	13 ± 6	ρ = .76[a]	1
MESA-urge	8 ± 4	9 ± 4	ρ = .84[a]	.47

Patient bother and quality of life impact from urinary incontinence does not require assessment of incontinence episode frequency using a urinary diary.

[a] Spearman's correlation significant level $P < .001$.

[b] Wilcoxon signed rank test.

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and UDI-6 items completed (item range 0-3) was calculated and multiplied by 33.3 to achieve a range of 0 to 100, with higher scores indicating greater impact or more bother, respectively.[3] The MESA assesses the frequency of urine incontinence symptoms using 2 separately scored subscales. Stress incontinence symptoms have a potential score range of 0-27, and urge incontinence scores range between 0-18.[4] In addition, demographic data and past medical history were recorded.

Statistical analysis

SPSS for Windows Version 13 (Chicago, IL) was used for data management and statistical analysis. Data were plotted on a histogram for determination of normality. As distribution did not follow the Gaussian distribution curve, we chose to use nonparametric tests. Wilcoxon signed rank test was used for nonparametric repeated measures. Test-retest reproducibility was investigated by calculating Spearman's correlation coefficients between repeated measures. Scatterplots and Spearman's correlation coefficients were used to investigate the relationships between diary content and severity of symptoms. Multivariate linear regression was used to determine predictive factors for bother from urinary incontinence symptoms on UDI-6. In the final model, we retained number of urge and stress incontinence per week, 24-hour voided volume, frequency during the day, and number of urinations during night. A .05 significance level was used for all statistical tests.

Results

Forty-seven patients with a mean age of 62 (range 34-86) years were included in the study. Most participants (98%) were Caucasian; concomitant medical problems included hypertension in 20 (43%) patients, cardiac disease in 7 (15%), diabetes in 5 (11%), and neurological disorder in 4 (9%). The mean ± SD scores for the first set of questionnaires were: UDI-6: 45 ± 22, IIQ-7: 35 ± 30, MESA stress: 13 ± 7, and MESA urge: 8 ± 4. These questionnaires were reproducible with good correlations with the repeat measure 2 weeks later (Table). The mean number of urge incontinence episodes per week decreased over the 2 weeks (first week 9 ± 17, second week 6 ± 10) ($P < .04$), but the number of episodes per patient was well correlated (Spearman's $\rho = .696$, $P < .001$). The mean number of stress incontinence episodes per week was stable from the first to the second week (first week 6 ± 10, second week 5 ± 12, $P = .24$). However, there was poor correlation between the 2 diaries of individual patients ($\rho = 0.16$, $P = .32$). All other diary variables, including the number of urge incontinence episodes, total voids, and 24-hour voided volume were highly correlated at both time points (Table).

Questionnaire responses varied in their clinical utility for incontinence severity prediction. The UDI-6, IIQ-7, and MESA subscale scores did not correlate with number of stress or urge incontinence episodes on diary. The UDI-6 and IIQ-7 were moderately correlated with total number of incontinence episodes ($\rho = .54$ and $\rho = .61$, respectively, $P < .0001$). Bivariate analysis revealed potential associations between the following clinically relevant variables: urge and stress incontinence per week, 24-hour voided volume, frequency during the day, and number of urinations during night. Using multivariate linear regression demonstrated that only the number of urge incontinence episodes predicted incontinence severity as determined by UDI-6 ($R^2 = .38$, $P < .03$).

Comment

Many measures have been proposed for clinical incontinence evaluation. Obstetrician-gynecologists are aware of the need to screen for urinary incontinence, as it is a treatable disorder that dramatically decreases the quality of life of affected women. However, further assessment of the patient-perceived severity of incontinence has received little attention. Our study supports previous findings, which demonstrated that the urge incontinence component of MUI has a greater impact on patient perception of incontinence severity than the stress component.[5,6] While researchers may use multiple tools to characterize various aspects of urinary incontinence, simple