Mixed Incontinence Masked as Stress Induced Urgency Urinary Incontinence

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Abbreviations and Acronyms

BHS = Bladder Health Survey
MUI = mixed UI
SUI = stress UI
UI = urinary incontinence
UUI = urgency UI

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Purpose: We sought to understand variations in the expression and temporal relation of bladder control episodes among women with mixed urinary incontinence.

Materials and Methods: A random sample of women 40 years old or older with mixed urinary incontinence on GLOBE-UI (General Longitudinal Overactive Bladder Evaluation-Urinary Incontinence) was recruited in a digital daily diary study using a smartphone application. When a bladder control event occurred, women were instructed to answer episode specific questions. Episodes were defined as urgency, and urinary incontinence with and urinary incontinence without urgency. Women and episodes were compared by the type of activity preceding each episode. Urinary incontinence episodes were further defined as stress urinary incontinence, urgency urinary incontinence, stress induced urgency urinary incontinence and other. The chi-square and Wilcoxon tests were used for categorical and continuous variables, respectively.

Results: Of 40 women with a mean age of 65.5 years 35 provided complete 30-day diary data. Of the 950 bladder control episodes reported 25% were urgency only, 55% were urinary incontinence with urgency and 19% were urinary incontinence without urgency. Of the urinary incontinence episodes without urgency 82% occurred after a stress activity (eg coughing or sneezing). Notably, a stress activity also occurred just before 52.5% of the urgency urinary incontinence episodes ($p < 0.001$). A total of 24 women (69%) reported at least 1 episode of stress induced urgency urinary incontinence, which was the most prevalent urinary incontinence subtype episode, followed by urgency urinary incontinence and stress urinary incontinence (29% vs 27% and 16%, respectively). The mean number of daily episodes was 1 or 2 across all groups.

Conclusions: Women with mixed urinary incontinence express a heterogeneous set of bladder control episodes with stress induced urgency urinary incontinence as the dominant type.

Key Words: urinary bladder; urinary incontinence, urge; urinary incontinence, stress; female; questionnaires

Mixed UI, the most common type of UI in older women, is a heterogeneous disorder.[1–5] MUI is considerably more common than expected if SUI and UUI are assumed to be independent of each other.[6] This epidemiological feature indicates that SUI and UUI co-occur in a majority of women with MUI because of a common cause or some other means of interaction. Co-occurrence by chance is likely to be uncommon.

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The higher than expected prevalence of MUI could be due to SUI and UUI episodes that occur at separate times but are linked by a common predisposing factor.[7–11] Factors that provoke either subtype may be causally distinct (eg common cold vs excess caffeine intake) but they may correlate in individuals. This explanation is most relevant in women in whom SUI and UUI co-occur by chance. Alternatively, exogenous factors (eg excess weight) or situational factors (eg stress) may mediate co-occurrence and increase the risk of SUI and UUI episodes.[12,13] Finally, SUI episodes may provoke UUI episodes since these disorders give rise to mechanical and neuromuscular mechanisms of action proximal to each other.[6]

Understanding the temporal occurrence of SUI and UUI episodes would offer important etiological clues about MUI.[14,15] We used a daily digital diary to better understand variations in the expression of MUI and the relation among the bladder control episodes that women experience.

METHODS

We performed a digital daily diary study in a sample of 40 women with MUI using GLOBE-UI.[16,17] We briefly describe the original study and the methods of the diary study. The Geisinger Health System institutional review board approved the study.

Source Population and GLOBE-UI Cohort

Diary study participants were selected from the 8,497 women 40 years old or older in the GLOBE-UI cohort from primary care practices in central and northeastern Pennsylvania. Participants completed BHS. Details of the BHS survey method were previously described.[18] BHS includes lifetime, 6-month and 4-week questions on the occurrence of urgency, UI, SUI and UUI. BHS has proven reliability and clinical validity.[18]

Women in the diary study met the criteria for active SUI and UUI symptoms in the previous 6 months. As part of the original clinical validation study 15 of the 35 participants were previously clinically assessed with a structured protocol and diagnosed by a urogynecologist, including urodynamics. Of the 15 women 14 had confirmed mixed UI and 1 had UUI. Women with prior anti-incontinence surgery or medical treatment for overactive bladder were excluded from analysis. SUI was defined as a patient report of UI about half the time or more on at least 1 of 2 SUI questions.[18] UUI was defined as a patient report of UI about half the time or more on at least 1 of 2 UUI questions.[18]

Diary

Study Participant Selection and Recruitment. A total of 920 women met study inclusion criteria for active SUI and active UUI. Women were sampled from 8 strata defined by different levels of SUI and UUI. An initial letter was sent to women to notify them about the study and they were later telephoned to assess interest in participating in the study. Recruitment stopped after obtaining verbal consent from 5 women in each of the 8 strata for a total of 40 women.

Data Collection Protocol. Questions in the digital diary were motivated by traditional bladder control symptoms and by a large epidemiological longitudinal study suggesting variants of urine loss events that did not fit traditional constructs. Questions were mostly derived from the clinically validated BHS, which has been shown to have highly reliable questions.[18] The daily diary study was done using a smartphone application developed at the Survey Research Center, Pennsylvania State University. Participants were scheduled for group or home visit training. A help line number was provided for questions.

Digital diary questions were organized into 3 sections (supplementary Appendix, http://jurology.com/). When a bladder control event occurred, women were instructed to click the event tag showing a sequence of questions about the event nature, including what preceded the event, the urine loss amount if any and the participant psychological state during the event. Participants were next instructed to click the evening tag at bedtime to answer questions about frequency, UI episodes and pads used, fluid intake (including caffeine), and an overall rating of stress for the day. Section 3 was triggered by clicking the morning tag and answering questions about nocturia. Date and time of day were automatically logged for any diary transaction.

Analysis

Analyses were completed using the 30-day digital diaries and the BHS survey data, including age, body mass index, parity, marital status, education, smoking, alcohol status, history of diabetes, UI subtype scores, duration of time with UI, UDI-6 (Urogenital Distress Inventory), IIQ-7 (Incontinence Impact Questionnaire) and the Sandvik score. These data were used to compare diary study participants to the source population of GLOBE-UI participants. The chi-square and Wilcoxon signed rank tests were used for categorical and continuous variables, respectively. All analyses were done with SAS®, version 9.4.

We were interested in answering certain key questions. The first question was what the woman experienced in the moments before a bladder control episode. Three types of episodes were defined, including 1) urgency only, 2) UI with urgency and 3) UI without urgency. We compared the type of activity just preceding the occurrence of each of these episodes. We also compared mean volume of UI and mood of participants at the time of each episode.

The second question was whether there was variation in the frequency of the different episodes. Therefore, we estimated the total number of episodes overall and by subtype, and the mean number of days with at least 1 episode. We also generated mean frequency measures of overall and daily bladder control episodes. To do this we used answers to the bladder control event questions to further classify UI episodes into 4 subtypes (supplementary Appendix, http://jurology.com/). Subtype 1 was SUI ("Just leaked urine") and at least 1 of certain activities ("I coughed, sneezed or laughed," "I pushed or