Published in final edited form as:

Int Urogynecol J. 2011 June ; 22(6): 713–719. doi:10.1007/s00192-010-1328-5.

Preoperative hesitating urinary stream is associated with postoperative voiding dysfunction and surgical failure following Burch colposuspension or pubovaginal rectus fascial sling surgery

Tatiana V. Sanses

University of Maryland Baltimore, Baltimore, MD, USA

Linda Brubaker

Loyola University Medical Center, Maywood, IL, USA

Yan Xu

New England Research Institutes, Watertown, MA, USA

Stephen R. Kraus

University of Texas Health Science Center, San Antonio, TX, USA

Jerry L. Lowder

Magee Women's Hospital, University of Pittsburgh, Pittsburgh, PA, USA

Gary E. Lemack

University of Texas Southwestern, Dallas, TX, USA

Peggy Norton

University of Utah Health Sciences Center, Salt Lake City, UT, USA

Heather J. Litman

New England Research Institutes, Watertown, MA, USA

Sharon L. Tennstedt

New England Research Institutes, Watertown, MA, USA

Toby C. Chai

University of Maryland Baltimore, Baltimore, MD, USA

Abstract

Introduction and hypothesis—We hypothesized that certain preoperative voiding symptoms would be correlated with poorer post-continence surgery outcomes in women.

Methods—Preoperative voiding symptoms from 655 women were assessed with questionnaires. Outcomes (overall failures, stress-specific failures, and voiding dysfunction) after Burch or sling surgery were measured. Logistic regression models were used to associate preoperative voiding symptoms with postoperative outcomes.

© The International Urogynecological Association 2010

tchai@smail.umaryland.edu .

Conflicts of interest Linda Brubaker is a consultant for Pfizer. Gary E. Lemack is a researcher and consultant for Pfizer, a researcher for Allergan, and received honoraria from Astellas. Toby C. Chai is a consultant for and received honoraria from Pfizer and Astellas and is a researcher for Allergan.

Results—Hesitating urinary stream was associated with voiding dysfunction [OR 2.22, $p=0.01$], overall [OR 1.57, $p=0.03$], and stress-specific [OR 1.67, $p=0.009$] failures. A ten-point increase in preoperative Urogenital Distress Inventory-obstructive (UDI-O) subscore was associated with overall [OR 1.10, $p=0.049$] and stress-specific [OR 1.21, $p<0.0001$] failures. Even controlling for severity of POPQ stage, significant associations of hesitating urinary stream with voiding dysfunction, overall and stress-specific failures remained.

Conclusions—Preoperative hesitating urinary stream and obstructive voiding symptoms were associated with poorer surgical outcomes. Further studies in this area may be fruitful.

Keywords

Surgical outcome; Stress urinary incontinence; Voiding dysfunction; Voiding symptoms

Introduction

Prior studies have assessed the prognostic value of preoperative clinicodemographic facts and preoperative urodynamic data in predicting postoperative voiding function [1–7] and surgical success [1–5]. However, it is difficult to compare the results of these studies because of the differences in study design, small sample sizes, and the absence of standardized comprehensive assessment and outcome measures. Recently, the Urinary Incontinence Treatment Network reported the predictive values of baseline demographic, clinical factors [8], and urodynamic measures [9] on surgical success or voiding dysfunction [10] in women who participated in the Stress Incontinence Surgical Treatment Efficacy Trial (SISTER) [11], a randomized trial comparing the outcomes between Burch colposuspension (BC) and pubovaginal autologous fascial sling (PVS). Richter et al. reported that risk factors for stress failure were similar after Burch and rectus fascia sling procedures and included greater baseline urge incontinence symptoms, more advanced prolapse, and menopause without hormone replacement therapy [8]. Nager et al. reported that urodynamic measures, such as Valsalva leak point pressure, or presence of detrusor overactivity, did not predict the success/failure of the surgery [9]. Similarly, the urodynamic measures of preoperative non-intubated (non-catheterized or free flow) uroflowmetry and pressure-flow study were not predictive of clinically meaningful postoperative voiding dysfunction [10].

This analysis assessed the predictive value of preoperative voiding symptoms for postoperative voiding dysfunction and surgical outcomes using SISTER data. Certain preoperative voiding symptom(s) may be significantly associated with postoperative voiding dysfunction and/or surgical failures after surgery to correct stress urinary incontinence (SUI).

Methods

Six hundred fifty-five women with stress-predominant urinary incontinence symptoms were randomized to receive a BC or autologous rectus fascia PVS between February 2002 to June 2004 at nine clinical centers. Trial design and primary outcomes have been previously published [11,12]. Women were eligible for the study if they had predominant symptoms of SUI on MESA questionnaire for at least 3 months, a positive urinary provocative stress test at bladder volume ≤ 300 ml, voiding frequency of 12 times or less per day, a bladder capacity of ≥ 200 ml, a PVR urine volume of ≤ 150 ml (unless stage II–IV prolapse present). Study exclusion criteria were age < 21 years, pregnancy, evidence of obstructed voiding in the absence of prolapse, medical condition, and previous pelvic surgery or cancer treatment known to affect bladder or urethral function.

Subjective preoperative voiding symptoms

Assessment of voiding symptoms was performed at baseline before randomization using a non-validated voiding symptoms questionnaire and the Urogenital Distress Inventory (UDI)-validated questionnaire [13]. The UDI-obstructive (UDI-O) subscore reflects 11 items of the UDI related to obstructive voiding symptoms. Other assessments of voiding symptoms included subjects' categorical responses (yes or no) to the two main subsets of questions: (1) physical accommodations to facilitate voiding ("Do you currently have to strain—Yes/No, bend—Yes/No, lean—Yes/No, stand—Yes/No, press—Yes/No, push—Yes/No, and do something else to urinate—Yes/No"); and (2) characteristics of urinary stream ("Would you describe your current urine stream as steady—Yes/No, slow—Yes/No, spurting—Yes/No, hesitating—Yes/No, dribbling—Yes/No, or other descriptor of urinary stream—Yes/No"). Physical accommodation to facilitate voiding was considered normal if questions of straining, bending, leaning, and standing to urinate were all answered as "No", and abnormal if any of the items were answered "Yes". Characteristics of urinary stream were defined normal if all items, except steady stream, were answered "No". Composite scores for voiding symptom categories (stream and physical accommodation) were also calculated based on number of "yes" answers to each of the questions in voiding symptom categories (see footnotes a, b, and in Tables 2, 3, and 4).

Outcomes assessment and statistical analysis

Voiding dysfunction was defined as the need for the surgical revision to improve voiding postoperatively as determined by the treating physician, or the need for catheterization due to voiding difficulties at any time beyond 6 weeks after surgery. Overall treatment success was defined if all five conditions were met at 24 months postoperatively: (1) no self-reported symptoms of urinary incontinence; (2) less than 15 g in pad weight during a 24-hour pad test; (3) no incontinence episodes recorded in a 3-day diary; (4) negative urinary stress test; (5) no retreatment for urinary incontinence (including behavioral, pharmacologic, and surgical therapies). Stress-specific success was defined as: (1) no self-reported symptoms of stress incontinence; (2) negative urinary stress test; (3) no retreatment for stress incontinence. Any subject not meeting these definitions of overall treatment success or stress specific success was considered a failure.

Other variables might impact the association between preoperative voiding symptoms with the three postoperative outcomes of interest (postoperative voiding dysfunction, overall and stress specific failure). Therefore, we examined the association of other plausible variables including treatment, site, age, previous UI surgery/treatment, previous prolapse, POPQ stage, and UDI-O subscore with the three postoperative outcomes. Treatment and site were significantly associated with all three postoperative outcomes; whereas POPQ stage was significantly associated with only stress-specific failure outcome. Therefore, in the bivariate regression models, we controlled for both of these two variables (treatment and site). After these regressions, it appeared that hesitating stream was a consistent preoperative voiding symptom significantly associated with all three postoperative outcomes. We, therefore, performed another regression in which only hesitating stream was regressed against the three postoperative outcomes, but controlling for treatment, site, and POPQ stage.

For the associations with treatment failures (overall and stress-specific failures), data were analyzed only if subjects had both preoperative, subjective voiding symptoms and the postoperative outcome measures available. Odds ratios and the corresponding 95% confidence interval for the odds are presented in the tables. For instance, in Table 2, the odds of postoperative voiding dysfunction for those who reported "hesitating stream" was 2.22 that compared to those who did not report this symptom. A 5% two-sided significance level was used for all statistical testing. Planned multivariable modeling of the relationship

between preoperative voiding symptoms, and both postoperative voiding dysfunction and treatment failure was not implemented because of a few statistically significant bivariate associations with outcome.

Results

Nearly all SISTER participants (99%) provided data on preoperative subjective voiding symptoms. Subjective voiding symptoms of abnormal physical accommodation or characterization of urinary stream are shown in Table 1. The most commonly reported voiding symptom related to accommodation during voiding was bending (27.5%); the most common abnormality of urinary stream was dribbling after urination (77.4%) (Table 1). The number of preoperative voiding symptoms that a subject experienced ranged from none to ten, while the majority (63%) had more than one symptom.

Predictors of postoperative voiding dysfunction

Out of 646 women who had evaluable data, 57 were noted to have postoperative voiding dysfunction. The frequency of all preoperative voiding symptoms was similar in patients with and without postoperative voiding dysfunction. The percentages of subjects with any abnormal physical accommodations to facilitate voiding were 37% ($n=21/57$) versus 34% ($n=200/589$), $p=0.77$ of subjects with or without voiding dysfunction, respectively. The percentages of subjects with any abnormal urinary stream characteristics were 95% ($n=54/57$) versus 86% ($n=505/589$), $p=0.09$ of subjects with or without voiding dysfunction, respectively. The preoperative UDI-O scores were similar in both groups (24.01 ± 18.37 versus 25.13 ± 22.05 , $p=0.71$).

Table 2 demonstrates that only hesitating urinary stream was a predictor of postoperative voiding dysfunction on logistic regression analysis, OR 2.22 (95% CI 1.19–4.16, $p=0.01$). Preoperative UDI-O score and the composite voiding symptom scores were not significantly associated with postoperative voiding dysfunction.

Predictors of surgical success/failure

Most participants completed the 24-month overall and stress-specific outcome assessments, 79% and 83%, respectively. Hesitating urinary stream was the only preoperative subjective voiding symptom that predicted both overall failure (OR=1.57, 95% CI 1.04–2.38, $p=0.03$) and stress-specific failure (OR=1.67, 95% CI 1.14–2.45, $p=0.009$) (Tables 3 and 4). An increase of ten points on the preoperative UDI-O subscore was associated with overall failure (OR=1.10, 95% CI 1.00–1.20, $p=0.049$) and stress-specific failure (OR=1.21, 95% CI 1.10–1.32, $p<0.0001$). The stream composite score was predictive of overall failures (OR=1.16, 95% CI 1.01–1.33, $p=0.03$) and stress-specific failures (OR=1.23, 95% CI 1.08–1.40, $p=0.001$).

Because hesitating urinary stream appeared to be a key symptom in these analyses, we investigated whether women with hesitating urinary stream differed by additional variables that could account for the difference. First, we determined whether there were differences in urodynamic parameters between subjects with and without hesitating urinary stream. Subjects with this symptom have findings suggestive of bladder outlet obstruction with significantly decreased Qmax on non-instrumented uroflow (23.6 ± 10.7 versus 26.4 ± 11.3 cc/sec, $p=0.004$) and a higher mean Pdet at Qmax on pressure flow study (21.7 ± 12.9 versus 17.7 ± 12.1 cm of water, $p=0.003$), but no significant difference in mean post-void residual volume when compared to subjects without this symptom. Also, there was a higher prevalence of stage IV prolapse in women with hesitating urinary stream (20.5%–44/214) compared to those without (14.0%–61/437). After controlling for prolapse stage (along with

treatment and site) in the logistic regression models, the significant relationships between hesitating stream and postoperative voiding dysfunction, overall and stress-specific failures remained.

Discussion

Our study found that the specific urinary stream characteristic of hesitating urinary stream appeared to be the primary symptom associated with both postoperative voiding dysfunction and overall/stress treatment failures following BC and PVS in a randomized surgical trial of SUI treatment. Other urinary stream characteristics, including spurting stream and abnormality of urinary stream, were significantly associated with stress-specific failures. The symptoms of physical accommodation to facilitate voiding (strain, bend, lean, stand, press, push, other to urinate) did not predict postoperative voiding dysfunction nor surgical failures.

The questions used to query for preoperative voiding symptoms are not validated and do not include symptom bother. However, we also used the UDI instrument which is a validated instrument with a symptom bother component. The UDI-O subscore reflects obstructive voiding symptoms, and this subscore was significantly associated with overall and stress-specific failure (Table 3 and 4). The subscore of characteristics of voiding stream, but not the subscore of physical accommodation, was significantly associated with both overall and stress-specific failure. These findings suggest that query of obstructive voiding symptoms and changes in urinary stream characteristics may help prognosticate a less successful surgical outcome.

This report is the first to focus on the prognostic value of assessment of preoperative voiding dysfunction in predicting surgical outcomes in women undergoing surgical treatment for SUI. The SISTEr study is a large cohort of women who are typical candidates for SUI surgery. The prevalence of subjective voiding symptoms is higher in our population compared to community-dwelling women as previously reported [14]. Swithinbank and Abrams reported that urinary urgency was the most prevalent symptom (61%) [14]. Urinary hesitancy was present in 24% of community-dwelling women with 15% of symptomatic women identifying urinary hesitancy as a problem [14]. What we cannot conclude from this study, however, is whether urinary hesitancy and hesitating urinary stream are interpreted similarly by the women who are answering these questions. It is conceivable that women might interpret urinary hesitancy differently than hesitating urinary stream. Urinary hesitancy could be construed to mean difficult initiating urinary stream, whereas hesitating urinary stream could be construed to mean intermittent and/or interrupted urinary flow.

Hesitating urinary stream in our cohort was predictive of voiding dysfunction, overall and stress-specific surgical treatment failure after either BC or PVS. A potential explanation for association of this symptom with postoperative voiding dysfunction relates to possible pre-existing urethral/periurethral pathology causing obstructive voiding. It has been reported that women with difficulty voiding had abnormal ultrasound anatomic appearance, as well as abnormal electromyographic activity of the external urethral sphincter [15,16], and this condition was theorized to progress to urinary retention in certain women. While preoperative voiding pressures measured urodynamically did not predict postoperative voiding dysfunction [9], there is very little in the published literature determining which urodynamic parameter correlates with any particular voiding symptom in the female population. The study by Dietz et al. [17] showed similar findings to our study, i.e., urinary hesitancy was significantly associated with a lower Qmax on uroflowmetry. An explanation for hesitating urinary stream associated with lower success rate after BC or PVS could again relate to the fact that this symptom reflects intrinsic urethral/periurethral pathophysiology.

Surgery to correct SUI in an area (urethral/periurethral) with preexistent disease may predispose that surgery to have a higher likelihood of failure.

While post-void dribbling was the most common voiding symptom complaint with 77% of the SISTER cohort having this complaint, hesitating urinary stream was present only in 33% of the cohort. The prevalence of this symptom in our trial was similar to that in the Dietz study which was 26% [17]. It is important to recognize that if our analysis found that urinary dribbling was predictive of postoperative voiding dysfunction or surgical failure, this would not have as much impact. If a voiding symptom is highly prevalent, it would not be useful to query for this symptom as the majority would have this symptom. However, with hesitating urinary stream being less common at 33%, it would be important to ask about this symptom in order to help counsel a patient preoperatively about higher risks for postoperative voiding dysfunction and/or surgical failure.

While BC and PVS are less commonly performed compared to midurethral polypropylene slings (MUS), we could validate our findings from our randomized trial comparing transobturator versus retropubic MUS. The primary outcome of this trial of midurethral slings (TOMUS) was recently published [18]. However, the mechanisms of action are probably different for these different types of continence surgeries, so any comparisons of risk factors for surgical failures for these different surgeries should be done with caution.

Another potential issue is the generalizability of the SISTER population. Patients who might have been at a greater risk for treatment failure, such as those with preoperative fixed nonmobile urethra or severe detrusor overactivity, were excluded from this trial. However, even with this SISTER population, the overall and stress-specific failure rates range between 34% and 62% [11]; therefore, there are sufficient numbers of surgical failures in this population to be able to perform the regression analysis.

In summary, a preoperative voiding symptom hesitating urinary stream and obstructive voiding symptoms elicited by the UDI-O are associated with poorer surgical outcomes after BC and PVS, in terms of continence status and voiding dysfunction. Future studies investigating this relationship further may be warranted.

Conclusion

Hesitating urinary stream is the primary symptom associated with both postoperative voiding dysfunction and surgical failure following BC or autologous rectus fascia pubovaginal sling for treatment of SUI. Patients who report hesitating urinary stream and obstructive voiding symptoms prior to these procedures may benefit from additional counseling regarding an increased risk of postoperative voiding dysfunction and/or failure of the continence surgery.

Acknowledgments

This study was supported by NIH U01 DK58225, U01 DK58229, U01 DK58234, U01 DK58231, U01 DK60379, U01 DK60380, U01 DK60393, U01 DK60395, U01 DK60397, and U01 DK60401.

References

1. Bhatia NN, Bergman A. Urodynamic predictability of voiding following incontinence surgery. *Obstet Gynecol.* 1984; 63:85–91. [PubMed: 6537863]
2. Groen J, Bosch JLH. Bladder contraction strength parameters poorly predict the necessity of long-term catheterization after a pubovaginal rectus fascial sling procedure. *J Urol.* 2004; 172:1006–1009. [PubMed: 15311024]

3. Iglesia CB, Shott S, Fenner DE, Brubaker L. Effect of preoperative voiding mechanism on success rate of autologous rectus fascia suburethral sling procedure. *Obstet Gynecol.* 1998; 91:577–581. [PubMed: 9540944]
4. McLennan MT, Melick CF, Bent AE. Clinical and urodynamic predictors of delayed voiding after fascia lata suburethral sling. *Obstet Gynecol.* 1998; 92:608–612. [PubMed: 9764637]
5. Kawashima H, Hirai K, Okada N, Takahara Y, Kurisu T, Sumi T, et al. The importance of studying pressure-flow for predicting postoperative voiding difficulties in women with stress urinary incontinence: a preliminary study that correlates low Pdet $\times$ Qave with postoperative residual urine. *Urol Res.* 2004; 32:84–88. [PubMed: 15067432]
6. Wheeler TL, Richter HE, Greer WJ, Bowling CB, Redden DT, Varner RE. Predictors of success with postoperative voiding trials after a mid urethral sling procedure. *J Urol.* 2008; 179:600–604. [PubMed: 18082219]
7. Miller EA, Amundsen CL, Toh KL, Flynn BJ, Webster GD. Preoperative urodynamic evaluation may predict voiding dysfunction in women undergoing pubovaginal sling. *J Urol.* 2003; 169:2234–2237. [PubMed: 12771757]
8. Richter HE, Diokno A, Kenton K, Norton P, Albo M, Kraus S, et al. Predictors of treatment failure 24 months after surgery for stress urinary incontinence. *J Urol.* 2008; 179:1024–1030. [PubMed: 18206917]
9. Nager CW, FitzGerald M, Kraus SR, Chai TC, Zyczynski H, Sirls L, et al. Urodynamic measures do not predict stress continence outcomes after surgery for stress urinary incontinence in selected women. *J Urol.* 2008; 179:1470–1474. [PubMed: 18295276]
10. Lemack GE, Krauss S, Litman H, FitzGerald MP, Chai T, Nager C, et al. Normal preoperative urodynamic testing does not predict voiding dysfunction after Burch colposuspension versus pubovaginal sling. *J Urol.* 2008; 180:2076–2080. [PubMed: 18804239]
11. Albo ME, Richter HE, Brubaker L, Norton P, Kraus SR, Zimmern PE, et al. Burch colposuspension versus fascial sling to reduce urinary stress incontinence. *N Engl J Med.* 2007; 356:2143–2155. [PubMed: 17517855]
12. Tennstedt S, Urinary Incontinence Treatment Network. Design of the Stress Incontinence Surgical Treatment Efficacy Trial (SISTER). *Urology.* 2005; 66:1213–1217. [PubMed: 16360445]
13. Shumaker SA, Wyman JF, Uebersax JS, McClish D, Fantl JA. Health-related quality of life measures for women with urinary incontinence: the Incontinence Impact Questionnaire and the Urogenital Distress Inventory. Continence Program in Women (CPW) Research Group. *Qual Life Res.* 1994; 3:291–306. [PubMed: 7841963]
14. Swithinbank LV, Abrams P. A detailed description, by age, of lower urinary tract symptoms in a group of community-dwelling women. *BJU Int.* 2000; 85(Suppl 2):19–24. [PubMed: 10781181]
15. Fowler CJ, Kirby RS. Abnormal electromyographic activity (decelerating burst and complex repetitive discharges) in the striated muscle of the urethral sphincter in 5 women with persisting urinary retention. *Br J Urol.* 1985; 57:67–70. [PubMed: 4038618]
16. Noble JG, Dixon PJ, Rickards D, Fowler CJ. Urethral sphincter volumes in women with obstructed voiding and abnormal sphincter electromyographic activity. *Br J Urol.* 1995; 76:741–746. [PubMed: 8535718]
17. Dietz HP, Haylen BT. Symptoms of voiding dysfunction: what do they really mean? *Int Urogynecol J Pelvic Floor Dysfunct.* 2005; 16:52–55. [PubMed: 15647963]
18. Richter HE, Albo ME, Zyczynski HM, Kenton K, Norton PA, Sirls LT, et al. Retropubic versus transobturator midurethral slings for stress incontinence. *N Engl J Med.* 2010; 362:2066–2076. [PubMed: 20479459]

Table 1

Distribution of preoperative subjective voiding symptoms

Preoperative voiding symptom	Yes (n=651)	Yes (%)
Physical accommodation to facilitate voiding		
Bend to urinate	179	27.5
Strain to urinate	107	16.4
Press to urinate	81	12.4
Lean to urinate	54	8.3
Push to urinate	41	6.3
Doing something else to urinate	29	4.5
Stand to urinate	22	3.4
Urinary stream characteristics		
Dribbling stream	504	77.4
Hesitating stream	214	32.9
Spurting stream	208	32.0
Slow stream	207	31.8
Steady stream (No)	106	16.3
Other descriptors of stream	49	7.5

Table 2

Preoperative subjective voiding symptoms predicting postoperative voiding dysfunction^a (*n*=646, voiding dysfunction present = 57, voiding dysfunction absent = 589)

Variable		Odds Ratio (95% CI)	P value from logistic regression
Physical accommodation to facilitate voiding			
Strain to urinate	Yes vs No	1.66 (0.79–3.52)	0.18
Bend to urinate	Yes vs No	1.26 (0.64–2.47)	0.51
Lean to urinate	Yes vs No	1.16 (0.37–3.63)	0.80
Stand to urinate	Yes vs No	3.37 (0.86–13.2)	0.08
Press to urinate	Yes vs No	1.02 (0.39–2.69)	0.96
Push to urinate	Yes vs No	1.34 (0.40–4.43)	0.63
Do others to urinate	Yes vs No	1.00 (0.21–4.82)	1.00
Physical accommodations to facilitate voiding	Normal vs. abnormal	0.74 (0.39–1.39)	0.35
Urinary stream characteristics			
Steady stream	Yes vs No	1.16 (0.48–2.82)	0.74
Slow stream	Yes vs No	0.81 (0.42–1.57)	0.53
Spurting stream	Yes vs No	1.26 (0.67–2.37)	0.48
Hesitating stream	Yes vs No	2.22 (1.19–4.16)	0.01
Dribbling stream	Yes vs No	1.25 (0.59–2.63)	0.56
Other description of stream	Yes vs No	1.43 (0.52–3.90)	0.49
Characteristics of urinary stream	Normal vs. abnormal	0.36 (0.10–1.26)	0.11
UDI-O subscale score			
UDI obstructive symptom score (+ 10 point)		1.03 (0.89–1.18)	0.71
Voiding symptom composite score ^b			
Stream score ^c		1.13 (0.91–1.40)	0.26
Physical accommodation to void score ^d		1.26 (0.90–1.75)	0.18

^acontrolling for treatment group and site

^bthe sum of “yes” responses to voiding symptom questionnaire

^cStream score=sum of all “yes” responses to urinary stream characteristics questions

^dPhysical accommodation to void score=sum of “yes” to strain, bend, lean, and stand to urinate

Table 3

Preoperative subjective voiding symptoms predicting overall treatment failure^a (*n*=520, failure=335, success=185)

Variable		Odds ratio (95% CI)	P value from logistic regression
Physical accommodation to facilitate voiding			
Strain to urinate	Yes vs No	0.88 (0.54–1.44)	0.61
Bend to urinate	Yes vs No	1.17 (0.77–1.79)	0.46
Lean to urinate	Yes vs No	1.62 (0.80–3.26)	0.18
Stand to urinate	Yes vs No	1.03 (0.40–2.63)	0.95
Press to urinate	Yes vs No	0.66 (0.38–1.16)	0.15
Push to urinate	Yes vs No	0.66 (0.33–1.33)	0.24
Do others to urinate	Yes vs No	0.58 (0.25–1.31)	0.19
Physical accommodations to facilitate voiding	Normal vs. abnormal	0.79 (0.53–1.18)	0.25
Urinary stream characteristics			
Steady stream	Yes vs No	0.77 (0.46–1.30)	0.33
Slow stream	Yes vs No	0.97 (0.65–1.45)	0.90
Spurting stream	Yes vs No	1.47 (0.97–2.23)	0.07
Hesitating stream	Yes vs No	1.57 (1.04–2.38)	0.03
Dribbling stream	Yes vs No	1.40 (0.89–2.18)	0.14
Other description of stream	Yes vs No	1.39 (0.68–2.86)	0.37
Characteristics of urinary stream	Normal vs. abnormal	0.87 (0.49–1.53)	0.62
UDI-O subscale score			
UDI obstructive symptom score (+ 10 point)		1.10 (1.00–1.20)	0.049
Voiding symptom composite score ^b			
Stream score ^c		1.16 (1.01–1.33)	0.03
Physical accommodation to void score ^d		1.06 (0.87–1.31)	0.55

^acontrolling for treatment group and site

^bthe sum of “yes” responses to voiding symptom questionnaire

^cStream score=sum of all “yes” responses to urinary stream characteristics questions

^dPhysical accommodation to void score=sum of “yes” to strain, bend, lean, and stand to urinate

Table 4

Preoperative subjective voiding symptoms predicting stress-specific failure^a ($n=543$, failure=261, success=282)

Variable		Odds ratio (95% CI)	P value from logistic regression
Physical accommodation to facilitate voiding			
Strain to urinate	Yes vs No	1.02 (0.64–1.63)	0.94
Bend to urinate	Yes vs No	1.16 (0.78–1.72)	0.47
Lean to urinate	Yes vs No	1.64 (0.85–3.15)	0.14
Stand to urinate	Yes vs No	1.26 (0.50–3.18)	0.62
Press to urinate	Yes vs No	0.85 (0.49–1.47)	0.56
Push to urinate	Yes vs No	0.92 (0.46–1.85)	0.82
Do others to urinate	Yes vs No	0.76 (0.33–1.71)	0.50
Physical accommodations to facilitate voiding	Normal vs. abnormal	0.75 (0.52–1.10)	0.14
Urinary stream characteristics			
Steady stream	Yes vs No	0.72 (0.44–1.16)	0.18
Slow stream	Yes vs No	1.14 (0.78–1.67)	0.49
Spurting stream	Yes vs No	1.97 (1.33–2.91)	0.0007
Hesitating stream	Yes vs No	1.67 (1.14–2.45)	0.009
Dribbling stream	Yes vs No	1.50 (0.98–2.30)	0.06
Other description of stream	Yes vs No	1.23 (0.64–2.38)	0.53
Characteristics of urinary stream	Normal vs. abnormal	0.58 (0.34–0.99)	0.04
UDI-O subscale score			
UDI obstructive symptom score (+ 10 point)		1.21 (1.10–1.32)	<.0001
Voiding symptom composite score ^b			
Stream score ^c		1.23 (1.08–1.40)	0.001
Physical accommodation to void score ^d		1.10 (0.90–1.34)	0.34

^acontrolling for treatment group and site

^bthe sum of “yes” responses to voiding symptom questionnaire

^cStream score=sum of all “yes” responses to urinary stream characteristics questions

^dPhysical accommodation to void score=sum of “yes” to strain, bend, lean, and stand to urinate