Male stress urinary incontinence is often underreported

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Introduction: Patient-reported pads per day use is a widely used metric in grading the severity of stress urinary incontinence and guiding surgical decisionmaking, particularly in mild-to-moderate cases. We sought to compare patient-reported stress urinary incontinence severity by pads per day with objective findings on standing cough test. We hypothesize that patient-reported pads per day often underestimates stress urinary incontinence severity.

Materials and methods: We retrospectively reviewed our male stress urinary incontinence surgical database and identified 299 patients with self-reported mild-tomoderate stress urinary incontinence who were evaluated with standing cough test prior to surgical intervention between 2007 and 2019. Patients were evaluated with the Male Stress Incontinence Grading Scale for urinary leakage during a standing cough test. This test has been

Introduction

Stress urinary incontinence (SUI) persists long term in up to 20% of patients after radical prostatectomy

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Address correspondence to Dr. Allen F. Morey, Department of Urology, University of Texas Southwestern Medical Center, 5323 Harry Hines Blvd., Dallas, TX, USA 75390-9110 shown to reliably and accurately predict surgical success. Binary logistic regression analysis was used to identify parameters associated with stress urinary incontinence upgrading in a multivariable model.

Results: Among 299 patients with reported mildto-moderate stress urinary incontinence, 101 (34%) were upgraded to severe stress urinary incontinence by standing cough test. Prior stress urinary incontinence surgery (OR 4.1, 95% CI 2.0-8.0, p < 0.0001) and radiation (OR 3.2, 95% CI 1.7-5.7, p < 0.0001) were significantly associated with Male Stress Incontinence Grading Scale upgrading in multivariable analysis. **Conclusions:** Roughly one-third of men who report mildto-moderate stress urinary incontinence actually have severe incontinence observed on physical examination. All men being evaluated for stress urinary incontinence should undergo standing cough test to accurately grade incontinence severity and guide surgical management.

Key Words: artificial urinary sphincter, male sling, stress urinary incontinence, surgical intervention, urinary incontinence

and 10% of patients following prostate radiation.¹⁻⁴ Although surgical SUI treatments are highly effective, they are likely underutilized with only 3.6% of prostatectomy patients undergoing surgical SUI intervention within 2 years of cancer treatment.⁵ Among men who ultimately undergo artificial urinary sphincter (AUS) placement, approximately one third have suffered with SUI for over 5 years.⁶ An important contributor to delayed intervention may be the ongoing controversy of how to best stratify treatment options among men with mild-to-moderate SUI who may be considered candidates for either a transobturator suburethral sling or an AUS.⁷⁻¹³ Counseling patients with mild-to-moderate SUI can be a challenge because of the lack of a practical and reliable method to grade SUI.^{11,14}

Patient-reported pad per day (PPD) measurements allow for an estimation of incontinence severity, but unmeasured variations in patient activity level, type of pad used, and degree of wetting before switching pads creates uncertainty in patient reporting. While 24-hour pad weight is an accurate and objective method for quantifying SUI, and has been shown to correlate well with surgical outcomes, it is quite cumbersome for patients to perform, and is not widely utilized.^{11,15,16} Given the inherent subjectivity of PPD and the burden of 24-hour pad weight assessments, we incorporated the standing cough test (SCT) into our standard evaluation of male SUI and later developed a SUI severity classification based on SCT results called the Male Stress Incontinence Grading Scale (MSIGS, Table 1).¹⁷ The SCT has been validated as a reproducible and reliable test for grading male SUI.¹⁷ MSGIS has been validated against 24-hour pad weights and shown to correlate strongly with success rates following surgical intervention for SUI.¹⁸ In our practice, we find MSIGS scores most valuable in guiding management of mild-to-moderate SUI where the inherent variability of PPD reporting may unreliably influence surgical management, making more objective measures of incontinence severity clinically useful.

We have noted that many men with mild-tomoderate SUI based on self-reported history are referred for possible transobturator sling placement when they may be better suited for AUS placement. We sought to determine the percentage of men with a history of self-reported mild-to-moderate SUI based on PPD use who were found to have severe leakage on SCT. We hypothesized that men reporting mild-tomoderate SUI based on PPD have severe leakage on SCT and therefore would be best served by an AUS.

TABLE 1. Male stress incontinence grading scale (MSIGS)

Grade	Definition
0	No leakage
1	Delayed drops only
2	Early drops, no stream
3	Early drops, delayed stream
4	Early and persistent stream

Materials and methods

We retrospectively reviewed our single-surgeon male SUI surgical database and identified 299 male patients with self-reported mild-to-moderate SUI (defined by use of \leq 3 PPD) who were evaluated in our clinic with a SCT prior to undergoing surgical intervention between 2007 and 2019. PPD usage was determined on history, simply by asking the patient to report their average daily pad use. Prior to SCT, patients verbally confirmed that they had not voided for at least 1 hour, allowing for the collection of roughly 60 cc of urine at the bladder neck at the time of testing (1cc urine production/kg/hour). During the physical exam, all patients were then asked to perform a series of four forceful coughs, and the degree of leakage was scored using MSIGS.¹⁷

Patients were stratified based on whether or not SUI severity was "upgraded" according to MSIGS criteria. MSIGS grades 0-2 were considered mild-to-moderate SUI and grades 3-4 were considered severe SUI. Chi-squared tests and student's t-tests were used to compare patient characteristics between those patients who were upgraded following SCT and those were not. Multivariable binary logistic regression analysis was performed to evaluate for factors associated with upgrading on SCT. All statistical analyses were performed in SPSS (Armonk, NY, USA: IBM Corp.) with p < 0.05 considered statistically significant.

Results

Roughly one-third of patients in this cohort (101/299, 34%) were upgraded to severe SUI (MSIGS 3-4) based on in-office SCT, Figure 1. Upgraded patients had a higher prevalence of prior SUI surgery (32% versus 11%, p < 0.00001, Table 2), and pelvic radiation





	Not upstaged	Upstaged	p value
	n = 198	n = 101	P · · · · · · ·
Patient demographics			
Mean age at surgery	68	69	0.493
	(range 41-86)	(range 48-92)	
Mean BMI at surgery	21.16	29.12	0.090
	(range 19.9-42.6)	(range 20.6-51.0)	
History of diabetes	37 (18.7%)	22 (21.8%)	0.525
History of hypertension	105 (53.0%)	57 (56.4%)	0.576
History of ED	144 (72.7%)	66 (65.3%)	0.187
Smoking history	106 (53.5%)	49 (48.5%)	0.411
Treatment history			
Radiation	31 (15.7%)	39 (38.6%)	< 0.00001
Prostatectomy	190 (95.9%)	85 (84.2%)	0.0003
TURP	4 (2.0%)	5 (5.0%)	0.161
Prior SUI surgery	21 (10.6%)	32 (31.7%)	< 0.00001
Prior IPP	14 (7.1%)	11 (10.9%)	0.259

TABLE 2. Patient characteristics stratified by MSIGS

MSIGS = male stress incontinence grading scale; BMI = body mass index; ED = erectile dysfunction; TURP = transurethral resection of the prostate; SUI = stress urinary incontinence; IPP = inflatable penile prosthesis

(39% versus 16%, p < 0.00001, Table 2) than those who were not upgraded (MSIGS 0-2 on SCT). A significantly higher proportion of men who were not upgraded (MSIGS 0-2 on SCT) had a history of radical prostatectomy (96% versus 84%, p < 0.001, Table 2). Importantly, a substantial number of patients with no history of either prior SUI surgery or pelvic radiation were nonetheless upgraded on SCT (42/188; 22.3%) and nearly two-thirds of patients overall reported pad-use that was inconsistent with their MSIGS score on SCT (187/299, 62.5%). Among men with a history of prior SUI surgery, 60% (32/53) of men were upgraded on SCT versus only 28% (69/246) of men with no such history (p < 0.00001). Similarly, when patients were stratified by radiation history, 56% (39/70) of men with a history of radiation were upgraded, as opposed to 27% (62/229) of men without prior radiation (p < 0.00001). There were no other significant differences in patient demographics or treatment history between the two cohorts, Table 2. When adjusting for patient age, body mass index (BMI), and smoking history on multivariable analysis,

TABLE 3. Parameters associated with MSIGS upgrading

	Odds ratio	95% confidence interval	p value	
Patient demographics				
Age at surgery	0.998	0.961-1.036	0.901	
BMI at surgery	1.029	0.969-1.093	0.345	
Smoking history	0.697	0.407-1.193	0.188	
Treatment history				
Radiation	3.153	1.735-5.728	0.000	
Prostatectomy	0.199	0.055-0.723	0.014	
TURP	0.390	0.058-2.605	0.331	
Prior SUI surgery	4.036	2.046-7.961	0.000	

MSIGS = male stress incontinence grading scale; BMI = body mass index; TURP = transurethral resection of the prostate; SUI = stress urinary incontinence

prior SUI surgery was significantly associated with upgrading on SCT with an odds ratio of 4.0 (95% CI 2.0-8.0, p < 0.00001). Pelvic radiation was also independently predictive of upgrading with an odds ratio of 3.2 (95% CI 1.7-5.7, p < 0.00001), Table 3.

Discussion

In this study, we found that more than one-third of men who reported mild-to-moderate SUI demonstrated severe SUI on SCT (34%). In men without any history of prior SUI surgery of pelvic radiation, this number is nearly 25% (42/188). A history of prior SUI surgery and of pelvic radiation were both significantly associated with SUI upgrading, while a history of radical prostatectomy was negatively associated with upgrading. Compared to their counterparts without a radiation history, patients who had undergone pelvic radiation were three times more likely to underreport their SUI as mild-to-moderate when it was actually severe based on the MSIGS criteria. Men who had undergone prior SUI surgery were four times more likely to underreport their SUI compared to men with no such treatment history. To the best of our knowledge, this is the first study to report the rate of SUI upgrading by physical exam and to identify both radiation history and prior SUI surgery as factors associated with upgrading.

The substantial portion of men whose SUI severity was upgraded by SCT suggests that subjective assessment of SUI by PPD use alone is inadequate for accurately assessing SUI. Current AUA guidelines state that men with mild-to-moderate SUI are candidates for either AUS or transobturator suburethral sling, but there are no established protocols for defining SUI severity or further stratifying these patients.^{11-13,19} While the importance of the physical exam is emphasized in the 2019 AUA guidelines for surgical management of female SUI, guidelines for surgical management of male SUI support evaluation of SUI severity prior to surgical intervention either through history or by physical exam.^{13,20} It is notable that many of the patients in this cohort were specifically referred to our practice for urethral sling placement for mild-tomoderate SUI, yet a clear discordance was often noted between reported history and physical exam findings.

The men upgraded to severe SUI on SCT would likely have been undertreated by transobturator sling, highlighting the importance of the physical exam in accurately assessing and managing male SUI. While most physicians agree that men with a history of pelvic radiation or prior SUI surgery (sling or AUS) are poor sling candidates, it is important to note that nearly 25% of men in this study with no such history were nonetheless upgraded by SCT. This cohort represents a substantial number of men that may well have been spared an unsatisfactory sling result because of the SCT.

PPD underreporting

While it is possible that the discordance observed between patient reports and physical exam findings is physiologic in origin, we believe it is better explained by patient expectations. Patients undergoing prostatectomy may expect to have postoperative incontinence and thus may be more liberal with their PPD estimation and more willing to report severe SUI. Given its less invasive nature, radiation patients may expect to be dry after treatment and subsequently downplay the severity of their incontinence; it is also possible that radiation patients curtail their physical activities to a greater degree to limit leakage. Those who have undergone a prior SUI surgery likely expect a higher degree of continence and thus may underreport the severity of their SUI. We also suspect that these patients may modify their lifestyle, avoiding strenuous activity and becoming sedentary, to reduce their SUI burden. While our study was not designed to determine the reason for these differences in underreporting, given the paucity of literature on this subject we find that these significant differences and risk factors for underreporting of SUI severity warrant further study.

Impact of pelvic radiation

Though there has been no prior research identifying risk factors for SUI underreporting, risk factors associated with SUI surgical failure have been well-described.²¹ More severe SUI is associated with sling failure - it is well-established that these patients are better suited for an AUS.¹¹⁻¹³ A history of radiation therapy is also known to predispose to sling failure by decreasing urethral tissue compliance and limiting urethral mobility such that adequate urethral compression is difficult to achieve.^{22,23} Our study establishes radiation therapy as a risk factor for underreporting of SUI severity, indicating that many men with a history of radiation are self-reporting what is actually severe SUI as mild-to-moderate based on PPD usage. While patients with true mild-to-moderate SUI are reasonable candidates for either sling or AUS, patients who erroneously report mild-to-moderate SUI may be inappropriately treated with sling placement when they would be better served by AUS placement. Thus, underreporting of SUI by radiation patients may be a contributor to the relationship between radiation history and sling failure.

Telehealth implications

The COVID-19 pandemic has caused a surge of interest in telemedicine, with current literature suggesting that telemedicine has been implemented successfully in treating a variety of common urological conditions, including urinary incontinence. In the current landscape, telemedicine encounters have been instrumental in offering urological care without the risk of contagion that face-to-face interactions confer.^{24,25} Given the convenience and broader reach that virtual visits offer, it seems likely that telemedicine will become a permanent component of urological care.^{24,25} While current literature suggests that telehealth encounters may be suitable for initial evaluation of SUI patients, our data highlights the significant limitations of stratifying SUI severity based on history alone. When remote evaluations of SUI are necessary, it may be helpful to recognize that radiation and prior SUI surgery are associated with underreporting based on PPD. However, it is important to note that nearly a quarter (42/188,22.3%) of men with no such history were upgraded based on in-office SCT. While virtual visits are useful for continuity of care and may be suitable for initial SUI evaluation and counseling, given the substantial rate of discordance between history and physical exam, patients should not undergo definitive surgical treatment without first undergoing physical exam to confirm SUI severity.

SUI downgrading

While roughly one-third of patients were upgraded on in-office SCT, 21% of patients (63/299) were also "downgraded" from moderate to mild incontinence and nearly two-thirds of patients reported pad-use inconsistent with their MSIGS score on SCT (187/299, 62.5%). This speaks to the inherent variability and heterogeneity within the mild-to-moderate patient context, underscores the value of SCT in further stratifying these patients, and further highlights that patient-reported PPD is not an accurate measure of incontinence severity. We believe that SUI upgrading (mild-moderate to severe) is of much greater clinical importance than SUI downgrading (moderate to mild) in that the former may prevent failed sling surgeries. Nonetheless, rates of SUI downgrading by MSIGS (especially in men with severe SUI by PPD who were excluded from this study) is a ripe area for future research.

Limitations

Limitations in this study include its single center, retrospective nature. While we do acknowledge that

the single-surgeon design of the study may limit generalizability, our surgical techniques and clinical strategies closely follow standard practice guidelines; we expect they are very similar to those used at other institutions. The retrospective study design could also allow for confounding. However, given the only significant differences in preoperative variables between the two cohorts were those also significantly associated with upgrading in our multivariable model, we believe this is unlikely.

We assess patient-reported PPD simply by asking the patient their average pad use rather than having them fill out a validated questionnaire or keep a home bladder diary. We acknowledge this practice could allow for recall bias and does not account for variations in pad size or degree of wetting. This speaks to the inherent subjectivity of PPD that initially led us to move towards a more objective assessment of SUI severity by physical exam. Moreover, much like 24-hour pads weights, we have found keeping a home bladder diary to be quite burdensome for patients, and patients do not reliably return a completed diary to their clinic visits, so it is not widely used in our practice.

We also do not formally assess bladder volume at the time of SCT. We found this to be time-consuming and non-productive in our initial several dozen patients. It did not provide meaningful data other than that bladder volume was typically between 50 cc-150 cc when the patient had not voided for at least 60 minutes prior to testing. While it would be helpful from a scientific perspective to quantify and standardize the volume of urine at the time of SCT, this is not practical clinically. Much of the practical value in SCT is how quick and easy it is to perform, making it feasible to consistently employ even at a busy tertiary care center. Thus, this would defeat the purpose.

Finally, though MSIGS has been validated with 24-hour pad weights and shown to correlate well with surgical outcomes, it has not been validated using urodynamics. While these more invasive tests may provide more detailed information on the anatomy and function of the lower urinary tract, they have much higher cost and time requirements than SCT. Moreover, their utility in predicting SUI surgery success has not been established.^{2,26-28}

Conclusions

Roughly one third of men who report mild-to-moderate SUI have severe SUI observed during in-office physical examination. Among the subset of these men with no history of pelvic radiation or prior SUI surgery – reasonable candidates for either a transobturator sling or an AUS – nearly 25% actually had severe SUI on SCT. In-office SCT is an efficient and reliable tool to further stratify patients with self-reported mild-tomoderate SUI and allow for more accurate prediction of surgical outcomes.

Disclosure

Dr. Allen Morey receives honoraria for being a guest lecturer/meeting participant for Boston Scientific and Coloplast Corp. All other authors declare that they have no conflict of interest.

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