Review Article on Surgical Management of Stress Urinary Incontinence in Men

A narrative review of the role of the Male Stress Incontinence Grading Scale in the surgical management of male stress urinary incontinence

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Background and Objective: Surgical treatment for male stress urinary incontinence (SUI) includes transobturator slings and artificial urinary sphincters (AUSs). Historically, 24-hour pad weights have been used to objectively grade the severity of male SUI and guide management decisions. In 2016, the Male Stress Incontinence Grading Scale (MSIGS) was developed as a scoring system for the standing cough test (SCT). This test can be performed at the time of initial consultation and is non-invasive, with significantly less burden to the patient compared to historical measures of male SUI.

Methods: A review of the reconstructive literature was conducted using PubMed and Google Scholar, reviewing articles that discuss the development of MSIGS, its correlation with objective measures of male SUI, and its use in guiding the choice of anti-incontinence surgical management.

Key Content and Findings: MSIGS has been shown to have a strong positive correlation with the 24-hour pad weight test and the subjective patient-reported pads per day (PPD). An MSIGS of 3 or 4 is used to recommend a patient for AUS placement and a score of 1 or 2 for male sling placement. Patient reported satisfaction rates were 95% for AUS and 96.5% for sling. Further, over 91% of men in the study reported they would recommend their selected procedure to other men with a similar condition.

Conclusions: The MSIGS is a non-invasive, efficient, and cost-effective way to evaluate men with SUI. The in-office SCT can be quickly and easily adopted into any clinical practice and provides immediate objective information that can be used to better counsel patients on anti-incontinence surgery selection.

Keywords: Male stress incontinence; male sling; artificial urinary sphincter; MSIGS

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Introduction

Stress urinary incontinence (SUI) negatively impacts patient quality of life following prostate treatment both for benign and malignant pathology (1). Idiopathic male SUI is rare, but the incidence of SUI increases following prostate treatments. With incontinence rates reported up to 31% after robotic radical prostatectomy (2), and 4% after radiation therapy (3), many men will ultimately require surgical management for their acquired incontinence (4,5). The mainstays of surgical treatment for male SUI include the transobturator sling and the artificial urinary sphincter (AUS) (6). The choice of surgical management for male SUI is influenced by several factors, including the severity of incontinence, age, comorbidities, performance status, and patient expectations/preferences. Objectively quantifying the degree of a man's incontinence is challenging and

historical measures place a significant burden on the patient.

In 2016, Morey and colleagues. developed a novel standardized incontinence grading scale based on an in-office standing cough test (SCT). This simple, non-invasive test could be easily incorporated into any community urology practice, however further research was warranted. There have been multiple publications since that time further evaluating the utility of this grading scale. In this review, we will discuss the development of the Male Stress Incontinence Grading Scale (MSIGS) and its role in guiding the surgical management for male SUI. We present this article in accordance with the Narrative Review reporting checklist (available at https://tau.amegroups.com/article/view/10.21037/tau-22-648/rc).

Methods

A review of the male stress incontinence literature was conducted using PubMed and Google Scholar, reviewing articles that discuss the standing cough test, development of the male stress incontinence grading scale, its correlation with objective measures of male SUI, and its use in guiding the choice of anti-incontinence surgical management. All studies that utilized the male stress incontinence grading scale to evaluate male stress urinary incontinence published after the pilot study in 2016 were included in this study. There were nine articles included, seven of which were from the same institution. The first and second authors independently compiled articles, compared results, and jointly summarized the findings.

Evaluation of SUI

There is a myriad of tools available to the clinician for the evaluation of male SUI. Voiding diaries (7), validated questionnaires such as the International Consultation of Incontinence Questionnaire Short Form (ICIQ-SF) (8,9), and patient reported pads per day (PPD) can be obtained relatively easily from a patient's history. However, there is no standardization regarding patient reported PPD with various sizes and types of male continence products available on the market, variable levels of patient activity, and inconsistent degrees of saturation before changing pads (10). To compound this, pad count is highly susceptible to recall bias and has been established as a poor measure of the severity of urinary incontinence in multiple studies (11).

Objective measures of male SUI include the 24-hour pad weight and the SCT. The 24-hour pad weight does offer improved standardization; however, this method presents significant logistical challenges for both the patient and office staff, and requires a highly motivated patient to collect urine-soaked pads (12). While the 24-hour pad weight test is a validated and objective evaluation of male incontinence, this test requires multiple office visits with the consulting urologist, which can extend the time to surgical intervention. The SCT was first suggested over 20 years ago by Kowalczyk *et al.* as a tool to aid in the decision to place a single or double cuff AUS (13). This test is performed with the patient standing at least 1 hour after the patient's last void to ensure the presence of urine in the bladder. With the patient standing, a towel is held inches from the urethral meatus and the patient is asked to produce a series of four strong coughs while being observed by two examiners. Despite its development two decades ago, a standardized evaluation using the SCT was not introduced until the introduction of the MSIGS by Morey *et al.* in 2016 (14).

Having routinely utilized the SCT over a decade at our tertiary referral subspecialty clinical practice, we began to recognize recurring patterns of leakage. The fundamental principle behind MSIGS is distinguishing leakage that is predominantly visible as drips versus a visible stream under stress to grade the degree of SUI. MSIGS grades leakage with the SCT on a scale of 0 to 4, with 0 being no leakage at all to 4 being an early and persistent urinary stream with cough (*Figure 1*), also demonstrated by previously published online video (14). The observed leakage must be synchronous with the cough as persistent leakage after the cough has subsided is indicative of cough induced detrusor overactivity. This test can be performed at the first clinic visit to evaluate a man's SUI and has virtually no burden to the patient. MSIGS, based on the SCT, has a strong positive correlation with both the subjective PPD count and the objective 24-hour pad weights (1). This exam has become an integral part of our standard evaluation for any patient presenting with SUI (14,15). We propose that MSIGS utility is derived from its ability to evaluate residual urinary sphincter function, with mild scores suggesting healthier peri-urethral tissue (16).

Other less common tests in SUI evaluation in men include urodynamics, and sphincter pressure under contraction (SPUC) using urethral profilometry profile (17). These tests can be costly, time consuming, invasive, and can delay definitive treatment. We prefer to rely on a careful history and physical exam in lieu of these more invasive tests which, in our opinion, are of limited value in straightforward, previously untreated cases of male SUI.

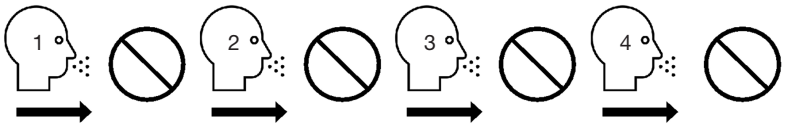
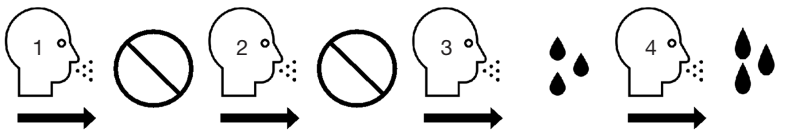
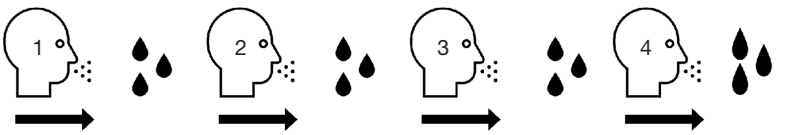
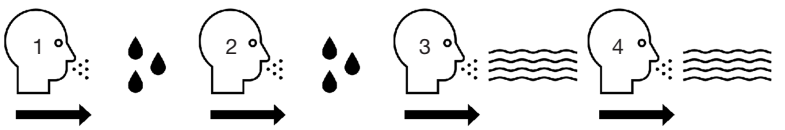
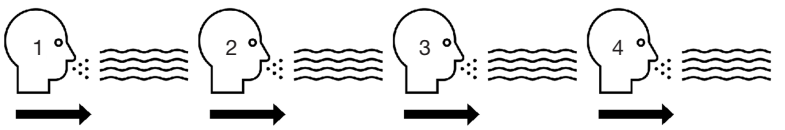
MSIGS score	Definition	Exam findings
0	Leakage by history only, no leakage on exam	
1	Late drops only	
2	Early drops, no stream	
3	Early drops followed by late stream	
4	Early and persistent stream	

Figure 1 SCT scoring by the MSIGS. MSIGS, Male Stress Incontinence Grading Scale; SCT, standing cough test.

Table 1 Correlation between SCT and pad weight

Source	Accession number	Pad weight method	MSIGS 0	MSIGS 1	MSIGS 2	MSIGS 3	MSIGS 4
Yi *et al.*, 2020	31692080	24-hour pad weight (g), mean	57	117.3	223	385.1	513.3
Dorado and Angulo, 2022	35055409	3-day average pad test (mL), median [IQR]	n/a	180 [150]	250 [70]	420 [293]	900 [530]

SCT, standing cough test; MSIGS, Male Stress Incontinence Grading Scale; IQR, interquartile range; n/a, not available.

Additionally, many of these tests are not readily available to the community urologist whereas the MSIGS can be performed reliably in any office setting at the time of initial consultation (15).

Validity of MSIGS

Undoubtedly, the SCT, graded with MSIGS, offers a measure of male SUI that is non-invasive, cheap, and with little burden to the patient or provider. But how does this novel diagnostic tool stack up against the more conventional measures of male SUI using PPD and 24-hour pad weight measures? During the pilot study, which included 62 consecutive patients who underwent MSIGS testing at initial clinic evaluation, a strong correlation was found between pre-operative MSIGS and PPD (r=0.74) (14,15). MSIGS has also been shown to correlate strongly with the 24-hour pad weight, which has a high predictive value for sling outcomes (18-21) (*Table 1*) (1,22). While there is currently no standardized cutoff for incontinence procedure selection based on the 24-hour pad weight test, Kumar *et al.* found that slings have significantly lower efficacy for patients with pad weight ≥400 g which correlates closely to MSIGS score of three (1,15,22,23).

Multiple factors associated with anti-incontinence surgery failure have been identified. Shakir *et al.* developed

a nomogram for predicting male sling failure (24). Using a nomogram-generated probability of failure rate ≤30%, the "ideal" sling candidate was identified as having a "median" PPD and MSIGS both ≤2 with no history of pelvic radiation. By comparing receiver-operating characteristic curves, the nomogram [area under the area (AUC) =0.81] built on MSIGS, history of pelvic radiation (XRT) and PPD was found to be superior to using PPD + XRT (AUC =0.77), PPD only (AUC =0.76), and cutoff of PPD >2 (AUC =0.71) as predictive metrics for sling failure (16).

Surgical intervention choice for male SUI

Based on the American Urological Association and European Association of Urology guidelines, slings are best suited for patients with mild SUI whereas men with severe symptoms should be offered AUS (25,26). In our initial effort to incorporate MSIGS into clinical practice, we prospectively treated 53 men with post-prostatectomy incontinence (PPI) with either a male sling or an AUS depending on their pre-operative MSIGS score. Men with mild SUI (MSIGS 0–2) underwent transobturator sling placement with the AdVance male sling (American Medical Systems, Minnetonka, MN, USA), and men with severe SUI (MSIGS 3–4) underwent placement of an AUS (AMS 800 series, American Medical Systems). Patient reported satisfaction rates (defined by responses to Patient Global Impression of Improvement) were 95% for AUS and 96.5% for sling (14,15). Further, over 91% of men in the study reported they would recommend their selected procedure to other men with a similar condition.

Men with moderate SUI historically pose a challenge to urologists, as the decision to pursue either a male sling or an AUS is less clear cut than for those men with very mild SUI or very severe SUI. Many men with self-reported mild-to-moderate SUI (PPD ≤3) are regularly referred to our clinic for consideration of a male sling. For nearly 300 men treated over a decade, Wolfe *et al.* demonstrated that 34% of these patients were upgraded to severe SUI after MSIGS was assigned. Prior anti-incontinence surgery and history of pelvic radiation were associated with an upgrade in the severity of male SUI (27).

Furthermore, patients with self-reported moderate SUI (2–3 PPD) can be stratified into favorable (MSIGS 0–2) or unfavorable (MSIGS 3–4). In our experience, the success rates (defined as 1 or fewer PPD) following male sling placement in the favorable group are significantly higher than the unfavorable group (64% *vs.* 33%) (28). When comparing male slings to AUS for moderate SUI, AUS outperformed the sling with success rates of 80% compared to 63%, despite the AUS group having significantly higher baseline PPD and baseline MSIGS. In our practice, we can prevent unnecessary—and likely ineffective—sling placement in patients who will ultimately require AUS by incorporating MSIGS into the standard male SUI evaluation (10).

Limitations

We acknowledge that much of the literature included in this review is reflective of a single surgeon's experience at a high-volume tertiary subspecialty practice. Further multi-institutional prospective studies evaluating the MSIGS utility in evaluating SUI and its use as a predictor for failure following SUI surgery could further validate and encourage its widespread adoption. There have however been some early adopters who have reported on their experience with MSIGS. Dorado and Angulo. used the MSIGS nomogram to predict success (defined as no pads or a single PPD with ≤20-mL 24-h pad-test) following Adjustable Transobturator Male Sling (ATOMS) (Agency for Medical Innovations, A.M.I.; Feldkirch, Austria) with an accuracy of 82.21%. Moreover, the ATOMS trial found MSIGS combined with a pad test (mean 24-hour pad weight over 3-day period) was superior to pad test alone as a predictor of success (AUC 82.36 *vs.* 77.43) (22). Abramowitz *et al.* failed to find a correlation between MSIGS and success rates (defined by 1 or less PPD at last follow-up) for the Virtue male quadratic sling (Coloplast, Humlebaek, Denmark), however this study deviated from our published protocol as the SCT was performed immediately following cystoscopic bladder filling (29). Performing the SCT under these conditions is not representative of typical day to day patient bladder dynamics.

Future directions

Although MSIGS provides a standardized grading scale for interpreting the SCT, there is no standardization to the SCT itself. The International Continence Society (ICS) has standardized the cough stress test in the evaluation of female stress incontinence using the ICS-Uniform Stress Cough Test educational module. This module instructs on the performance, interpretation, and reporting of the cough stress test in a standardized manner (30). The development of a similar educational module for evaluation of male stress

incontinence would be useful in the dissemination of this invaluable diagnostic tool.

Further validation of this grading scale is recommended as much of the existing literature is retrospective in nature and from a single institution. Multi-institutional efforts are needed to further validate MSIGS either by correlating with a validated SUI questionnaire, urodynamic findings or by confirming correlation with 24 hour-pad weight.

The MSIGS has mostly been utilized in the pre-operative setting and has not been studied as an objective measure as part of standard post operative follow-up protocols. This simple in-office exam may also have potential for delineating true SUI from other incontinence etiologies in patients with persistent incontinence following anti-incontinence surgeries.

Conclusions

The MSIGS is a non-invasive, efficient, and cost-effective way to evaluate men with SUI. The in-office SCT can be quickly and easily adopted into any clinical practice and provides immediate objective information that can be used to better counsel patients on anti-incontinence surgery selection.

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Footnote

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